6.1

UNIT COST CALCULATIONS AND THE BREAK EVEN

- Working Out Costs - The Terminology
- How To Work Out Your Break Even Point
- Costing And Break Even Exercise
- Costing The Job Exercises
- Glossary Of Financial Terms
Costing means looking at the amount to be spent on selling a product, running a production process or delivering a service.

Fixed And Variable Costs

Costs in a business are either fixed or variable:

**Fixed costs**: These are things that are always there, like plant, heating, lighting and rent. Sometimes called ‘indirect’ or ‘standing’ costs or simply overheads.

**Variable costs**: These include things like raw materials that vary in cost and quantity used. Sometimes called ‘direct’ or ‘running’ costs.

It is necessary to know which costs are fixed and which are variable before you can start to work out the true production costs of a product, or how much it costs to deliver a service.

In general major costs are broken down like this:

**Materials**: A variable cost as it will change depending on how much is produced.

**Direct labour**: This is labour directly involved in production and not administration etc. This is usually seen as a variable cost, since people theoretically can be hired and fired according to need; in practice, this is not always easy to achieve.

**Production Overheads**: This is usually considered a fixed cost, although increased levels of production can raise the amount of energy used.

**Research And Development**: A fixed cost, budgeted for in advance and overlong periods.

**Marketing And Distribution**: These are mostly fixed costs but there are some exceptions; for example, the amount of a salesperson’s commission will vary with the amount they sell.

**General Administration**: A fixed cost

A typical costing might look like this:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale price</td>
<td>200</td>
</tr>
<tr>
<td>Variables/direct costs</td>
<td>40</td>
</tr>
<tr>
<td>Gross profit</td>
<td>160</td>
</tr>
<tr>
<td>Fixed/overheads</td>
<td>95</td>
</tr>
<tr>
<td>Net profit (before drawings)</td>
<td>65</td>
</tr>
<tr>
<td>Drawings</td>
<td>40</td>
</tr>
<tr>
<td>Actual profit</td>
<td>25</td>
</tr>
</tbody>
</table>

Direct costs, overheads and drawings would all be calculated. The profit figure would be based on your objectives. The sale price is therefore arrived at last, based on the totals.

The method of calculating what to charge for overheads is set out on the following pages. The first example can also be used to work out a price to charge per hour when selling a service.
Calculating An Hourly Rate

This example demonstrates the calculations needed to establish your cost price per hour to cover your overheads and/or to work out an hourly rate for your services.

To calculate hourly charge:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decide realistic number of weeks worked during year</td>
<td>46</td>
</tr>
<tr>
<td>Estimate chargeable (productive) hours worked per person</td>
<td>30</td>
</tr>
<tr>
<td>Calculate total of estimated fixed costs</td>
<td>£20,000</td>
</tr>
<tr>
<td>Annual total of chargeable hours</td>
<td>46 x 30 = 1380</td>
</tr>
</tbody>
</table>
| Hourly charge to cover fixed costs                              | \[
\frac{20000}{1380} = £14.50
\]|

Therefore a costing for a particular job would be:

Any materials + direct labour charge + £14.50 hour + drawings

The selling price would be the above plus your profit.
Calculating The Cost

To calculate the cost of a manufactured item:

The cost is the variable costs (the raw materials plus the direct labour) plus the percentage of the overheads that this item represents. Every item produced must carry its fair share of the overheads.

An example:

Your sales are estimated at £100,000 and one particular product line represents half of that - £50,000. This is made up of 100 items at £500 each.

It is then valid to presume that this particular product is likely to have 50% of the overheads allocated to the costings for that product.

Therefore, if your overheads are £30,000 - 50% of this is £15,000.

To include this in the costing for the product you would calculate as follows:

\[
\text{Variable cost (per item)} + \frac{\text{£15,000}}{100} = \text{Cost of item}
\]

Therefore, if the materials and labour to produce one item cost £50 then:

- The cost of the item is £50 + £150 = £200
- The cost price is £200 not £50
- The selling price is £500, therefore the profit figure is £300
Costing Exercise

Imagine you are setting up a small business making wooden toys. You will not be employing anyone and you will be working from a small rented unit.

1: Name some of the variable costs you are likely to have?

2: Name some of the fixed costs you are likely to have?

To establish the cost of your product you would have to calculate exactly how much wood, paint, etc. each toy takes to make.

Let’s estimate this cost as £5 for each toy.

You have done some market research and you expect to sell 200 toys in the first 6 months.

Your fixed costs are:

- Rent: £100 per month
- Rates: £20 per month
- Heat and light: £250 per quarter
- Advertising: £40 per month
- Telephone: £50 per quarter

You are proposing to sell toys for £10.00

3: How much profit do you make in the first 6 months?

4: If there is a shortfall, what can you do to remedy this?
The break even point is the point where your income from sales is equal to all of your business expenses (cost of sales and overheads) and also the money you need to take from the business to survive.

There are two different calculations for two different types of business:

**Service Trade** i.e. where goods are not bought/manufactured and sold e.g. plumbers, hairdressers, etc.

**Retailers And Manufacturers** i.e. where goods are bought/manufactured and sold e.g. sweet confectioners, furniture makers and so on.

### Calculating Break Even For A Service Based Business

The level of sales required to meet all costs and personal requirements is simply:

<table>
<thead>
<tr>
<th>Overheads (per checklist)</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Drawings/personal survival budget</td>
<td>£</td>
</tr>
<tr>
<td>=</td>
<td></td>
</tr>
<tr>
<td>Sales required</td>
<td>£</td>
</tr>
</tbody>
</table>

You may also wish to calculate how many hours you would have to work or the number of services you would need to carry out in order to break even. This would be as follows:

| Number of hours required to break even | =  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overheads + Drawings/personal survival budget / Average charge per hour</td>
</tr>
</tbody>
</table>

| Number of services carried out to break even | =  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overheads + Drawings/personal survival budget / Average charge per service</td>
</tr>
</tbody>
</table>
Examples of each of the above are given below:

Shiverton Community Building sub-contracts labour-only to various building firms at a charge of £10.00 per man-hour. Its overheads per year are £24,600 and the wage bill is £62,000. How many chargeable man-hours would it have to contract for to break even? The business expects to work 48 weeks in a year.

Answer

\[
\frac{\text{£24600} + \text{£62000}}{\text{£10}} = \text{Break even is 8660 chargeable hours per year}
\]

Or

\[
\frac{8660}{48} = 180 \text{ chargeable man-hours per working week to break even}
\]

Sunniside Therapy Collective has an average charge per client of £12.00. Its overheads are £15,956 and the therapists take £8 from every commission/charge. How many clients does the Collective need to serve in a year to break even? The therapists are unavailable five weeks a year and are available to work 47 weeks in the year.

Answer

\[
\frac{\text{£15956}}{\text{£12} - \text{£8}} = \text{Break even is 3989 clients served per year}
\]

Or

\[
\frac{3989}{47} = 85 \text{ clients per week to break even}
\]
Calculating Break Even For A Product-Based Business

The break even is usually calculated in terms of the number of sales a business needs to make each year. This is calculated by subtracting the 'direct costs' of producing the product (the materials, power costs, direct staff costs and so on) from the price. What’s left, the gross profit, is often called the 'contribution per unit'.

<table>
<thead>
<tr>
<th>Indirect costs (wages, overheads etc)</th>
<th>Contribution per unit or sale</th>
</tr>
</thead>
</table>

This is best shown by way of an example:

Burnside Park Furniture makes park benches and sells them for £80. Materials and other direct costs are currently £14,000 a year. It has overheads of £8,180 and a wage bill for support staff of £32,000. The gross profit per sale is calculated to be £38. Therefore the break even point is:

Answer

\[
\frac{£8,180 + £32,000}{£38} = 1058 \text{ benches per year is the break even}
\]

Another way to calculate the level of sales required to break even is to use contribution per £ of sales. For instance, if the price is £80 but the direct costs are £60 then the percentage contribution or contribution per £ of sales is \((80 - 60) / 80\% = 25\%\) or £80 - £60 / £80 = £0.25 in the pound.

<table>
<thead>
<tr>
<th>Overheads + Indirect wages</th>
<th>Contribution per pound of sales</th>
</tr>
</thead>
</table>

This is best shown by way of an example:

Community Electrical Appliances refurbishes old gas cookers. It has overheads of £18,200 and staff support costs of £22,000.00. Its gross profit per £ of sales is 25p. Therefore the break even point is:

Answer

\[
\frac{£18,200 + £22,000}{25\% \text{ (or 25\%)}} = £160,800
\]
You must plan to do better than survive. In addition to your drawings you are likely to have to pay some Income Tax and National Insurance. Part of your profit will also be needed to fund your business as it grows.

The highest price will be the highest the market will bear without sales dropping. Somewhere between the two will be the price that will give you the highest possible profits. Remember, you only have to please enough customers who are prepared to pay your price - you do not have to please everyone, all of the time. The best price is the highest that the greatest number of customers are prepared to pay.

You could use the following as the basis of your costing calculation. The right hand column details where the figures will come from.

<table>
<thead>
<tr>
<th>Costs</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables/Directs</td>
<td>Suppliers</td>
</tr>
<tr>
<td>Fixed/Overheads</td>
<td>Research</td>
</tr>
<tr>
<td>Drawings</td>
<td>Calculation</td>
</tr>
<tr>
<td>Profit</td>
<td>Objectives set</td>
</tr>
<tr>
<td>Start up Costs</td>
<td>Research</td>
</tr>
<tr>
<td>VAT</td>
<td>Calculation</td>
</tr>
<tr>
<td>Tax</td>
<td>Calculation</td>
</tr>
</tbody>
</table>

The total of these will help establish the minimum figure to charge, when divided by the number of items you can make and sell, or the number of hours you can work and be paid for. You then need to go to a level which the market will stand.
COSTING AND BREAK EVEN EXERCISE

Wood ‘N’ Tops Community Enterprises has a furniture-making project which has decided to sell hi-fi tower units on a commercial basis. From the information given below, calculate:

1: The cost price

2: A selling price that will
(a) enable the project to break even (i.e. where income covers costs)
(b) cover costs plus a 10% net profit

Materials Costs (Per Unit)
Wood: £3.00
Laminates: £6.00
Screws and nails: £0.50
Rods and plates: £1.50

Labour Costs (Per Unit)
1 hour: £4.00 per hour
2 hours: £2.50 per hour

Direct Costs (Per Unit)
Power costs attributable are £50 per 100 units made
Transport costs are £12 per 50 units delivered

Indirect Costs (Per Unit)
Costs of insurances, permits, other labour, overheads, etc are calculated at £1500 per 1000 units.

Other Information
It is predicted the project can make and sell 3000 units per year, of which 01% would be sold but no income generated due to defaulting by debtors (bad debt). The lost sum would need to be included in the selling price and break even calculation. There is no VAT on this product.
Use the space below for your answers

1: The cost price

2: A selling price that will:
(a) enable the project to break even (i.e. where income covers costs)
(b) cover costs plus a 10% net profit

Answers can be found in the appendix on page 418
COSTING THE JOB EXERCISES

Exercise 1: Costing The Job

You are an interior decorator asked to quote to paint a large room. To cost up this job, the following information is required:

1 : Total amount of materials (paint) required = £
120 sq metres requiring 2 coats, 4 tins at £3.65 wholesale and £8.00 per tin retail.

2 : Time taken in terms of labour costs = £
1 hour to paint 20 metres, at £4.50 per hour

So the cost will be = £

Note: When costing a job do not charge the wholesale cost for materials but the retail cost since you will have costs of storage, delivery, waste etc.

Exercise 2: Costing The Job

Suppose you were asked to paint 3 rooms with total area 500 sq metres and wallpaper a fourth room. The paint costs the same as the above example and the wallpaper costs £2.75 per roll and 15 rolls are needed. You can paint at the same rate as before and wallpapering the fourth room will take 4 hours. The job is out in the country and will take two days. The distance to the house is 11 miles and you figure that the petrol for the journey costs 25p per mile and the trip will take 30 minutes. What are the costs of this work to the business?

1 : Cost of materials = £

2 : Labour costs = £

3 : Travel costs = £

So the cost will be = £

Answers can be found in the appendix on page 419
**Working Out The Unit Cost**

Some businesses will not be selling labour (by providing services like painting or car repair) but goods. They will need to work out what is the basis or unit cost of each item they are selling.

The unit cost is the cost of everything required to make and sell the item: labour, materials, power, packaging etc. These are called direct costs. To get a selling price each business adds something to cover other costs like rent on premises, phone bills and travel costs. These are called indirect costs.

The indirect costs and the amount of profit each business wants to make on each item are added to the direct costs usually in the form of a mark-up.

**Working Out The Unit Cost Exercise**

Work out the unit cost of the following items:

1 : A factory produces ball-bearings for industry. It makes 100,000 a year, all the same type. Materials cost £5,000, labour £30,000, power £10,000 and packaging £1,000 per year.

Unit cost = £

2 : A small craft workshop produces two wooden toys, a ‘Noah’s Ark’ and a ‘Rocking Horse’. What is the Unit Cost of each item?

a : The ark requires wood costing £2.50, paint costing £0.35, varnish costing £0.10 and 2 hours labour at £3.50 per hour.

Unit cost = £

b : The horse requires wood costing £24, paint costing £1.20, varnish costing £0.90, nails costing £0.30 and 5.5 hours labour at £4.50 per hour.

Unit cost = £

Answers can be found in the appendix on page 419
Pricing The Job/Working Out The Selling Price

The price you charge the customer will need to cover the basic direct costs of producing the item or selling your labour. To make a profit you also need to add something for the indirect or fixed costs (overheads) of the business and the profit you want to make to safeguard and expand the business.

But how much you add on depends on how many of each thing that you produce you actually sell. If you produced 100,000 ball bearings a year and had fixed costs of £10,000 we would need to add on:

\[
\frac{\text{Fixed costs}}{\text{Number of items sold}} = \frac{\£10000}{\£100000} = \£0.10
\]

Note: The amount you add on is based on the number of ball-bearings sold not the number of ball-bearings produced. Unsold goods can’t contribute to the fixed costs of the business.

To work out your selling price you need to know how many things you will sell each year.

Exercise 1: Working Out The Selling Price

Using the above example, with direct costs of £46,000 per 100,000 ball-bearings, indirect costs of £10,000 and a profit margin of £5,000 what would be the selling price for our ball-bearings if we produced:

1: 100,000 ball-bearings per year

2: 50,000 ball-bearings per year
Exercise 2: Working Out The Selling Price

But suppose instead of making ball-bearings we sold services like vehicle welding or gardening. In this case what we are selling is not ball-bearings but time. We need to work out the unit cost of our labour, then add on other costs. This is calculated as follows:

\[
\text{Hourly rate} = \frac{\text{Fixed costs (excluding materials and profit)}}{\text{Total chargeable hours}}
\]

Suppose you were a painter and decorator, you pay yourself £9600 and there are other indirect costs of £5000 per year. If you calculated you could work seven hours a day, six days a week, each week of the year, what would be your hourly rate?

\[
\text{Hourly rate} = \frac{\text{£14600}}{7 \times 6 \times 52} = \]

Many people make the mistake of assuming they can work long hours continuously but in fact they can’t. Firstly there are Bank Holidays when you can’t usually trade. Then there are your holidays, periods of sickness and times when you aren’t working but advertising, selling, doing your books, talking to suppliers or simply waiting for work to come in. All this time has to be deducted from the total number of chargeable hours to get your hourly rate.

Suppose in the above example, you could only deliver 6 hours work per day and you calculated that out of 365 days a year you would only actually be working on 250 of them (no work weekends and Bank Holidays and 3 days sickness). What would be your correct hourly rate?
Exercise 3: Working Out The Selling Price

Go back to the painting example, Costing The Job Exercise 1. Suppose you could work 2100 hours per year and paid yourself £9600. Fixed costs are £5000 and direct costs for this job are given below. You will need to work for twelve hours and you will need help for a further twelve hours though at a lower rate. What should the price to the customer be?

1: Your labour = £

2: Materials (paint) required, 4 tins x £8 = £

3: 12 hours sub-contract labour at £4.57 per hour = £

The price to the customer will now be:

\[
\text{Direct costs of materials} + \text{Sub-contract labour} + \text{Your labour at new rate}
\]

Answers can be found in the appendix on page 420
Accruals
Services or goods received but not (fully) paid for yet for example electricity bills or accountancy fees. They are treated as a current liability.

Balance Sheet
A statement of how much the business or organisation is worth and what form assets and liabilities take e.g. equipment or loans.

Capital Expenditure
Money spent to buy assets e.g. premises or equipment.

Cash In Hand
Actual money either in a float, petty cash or at the bank. Treated as a current asset.

Cost Of Sales
The direct costs of making the sales: materials but also possibly direct labour, sub-contracting, delivery, packaging - whatever is appropriate to the business.

Creditors
People or businesses you owe money to.

Current Assets
Assets easily convertible into cash.

Current Liabilities
Money owed which you would expect to pay soon.

Debtors
People or businesses that owe you money.

Depreciation
The nominal loss in value of machinery or equipment due to usage. It is a business cost.

Expenditure
All expenses of the business, adjusted for prepayments and accruals.

Factoring
An agreement for another organisation to provide you with cash while collecting money on your behalf. It chases your debts and charges a commission in return.

Fixed Assets
Capital equipment or other physical resources likely to last more than one year. The value is reduced each year by the amount of depreciation.

Fixed Costs
Costs of an organisation that do not change even if sales or other activities increase or decrease e.g. rent.

Gross Profit
The surplus after direct costs have been deducted from sales. Often expressed as a percentage.
Invoice
A written record that a customer has incurred a debt, issued when something is sold but not paid for immediately.

Leasing
An agreement to rent a piece of equipment. At the end of the agreement or if you stop paying the equipment goes back to the owner. You are never the legal owner.

Liabilities
All the debts and obligations of the organisation.

Liquidation
When a company announces it intends to sell its assets to pay its bills and then cease trading.

Loans Falling Due
The value of loans which you will have to pay within the falling year e.g. an overdraft. Treated as a current liability.

Margins Or Profit Margins
The difference between the value of sales and the cost to make them, expressed as a percentage.

Overdraft
Money you can draw on as you need it, up to a limit agreed with (usually) the bank.

Overheads
All business expenses other than the cost of sales.

Prepayments
Items paid for in advance but not received (in full), for example prepayments of rates, insurance, vehicle tax. They are treated as a current asset.

Profit
The amount left after taking expenditure from gross profit, often called pre-tax or trading profit. After tax or extraordinary expenditure has been made, the net profit is what is left for reinvestment or distribution.

Sales
In a profit and loss account, this is the value of the sales made, regardless of when payment is received.

Stock
The value, usually at cost price, of materials owned by a business and intended for future sales. Often based on a stock-take at the year’s or accounting period’s end.

Turnover
The total amount of money that has passed into the organisation over period of time.

Variable Costs
Costs which change when the volume of business or level of activity changes.