



Management Accounting Notes - Lecture notes, lectures 1 - 12

Cost Accounting And Decision Making (La Trobe University)

Management accounting (ACC2CAD)

Chapter one – Information for creating value and managing resources

What is management accounting?

Management accounting is defined as ‘processes and techniques that are focused on the effective and efficient use of organisational resources to support managers in their task of enhancing both customer value and shareholder value’ (it focuses on information for internal users of accounting information).

Customer value refers to the value that a customer places on particular features of a good or service (and which is what leads to them purchasing the product).

Shareholder value is the value that shareholders, or owners, place on a business – usually expressed in the form of increased profitability, increased share prices or increased dividends.

Managers need to understand what drives customer value and shareholder value. They need to understand and make decisions about activities and aspects of their business so they can enhance customer or shareholder value. For example how important is seating in restaurants? Do most customers want to eat in or take away?

Effective and efficient use of resources is essential to creating shareholder and customer value, management accounting provides this information (both financial (wages, cost of goods sold, product costs) and non-financial information (work processes, committed customers and suppliers) on resources) that allows managers to perform this role

Economy, Efficiency and Effectiveness

Economy concerns inputs. In a broad sense it means that the acquisition of sufficient quality and quantity of financial, human, physical and information resources at the appropriate times at the lowest cost.

Efficiency concerns both inputs and outputs. It means the use of financial, human, physical and information resources so that output is maximized for any given set of resource inputs. Or input is minimized for any given quantity and quality of output.

Effectiveness refers to the performance or actual outcome of an organization. It is the achievement of the objectives or other intended effects of activities.

Management accounting systems

Management accounting is the process of measuring and reporting information about economic activity within organizations, for use by managers in planning, performance evaluation, and operational control (controlling resources and creating value):

- Planning: For example, deciding what products to make, and where and when to make them. Determining the materials, labour, and other resources that are needed to achieve desired output.
- Performance evaluation: Evaluating the profitability of individual products and product lines.
- Operational control: knowing how much work-in-process is on the factory floor, and at what stages of completion, and maintaining a smooth flow of production.

. Despite management accounting systems, manager still need to look outside the organisation to make fully informed decisions. For example an ice-cream shop has reports of the costs of the ice-cream they produce however they need to look outside the organisation to find the cost from other manufacturers (competitors) which can be possible suppliers to franchisees. Management a

erm decisions.

Who needs management accounting information?

The information required by Managers varies according to the natures of resources that they manage this is because of the very different nature of the decisions that they make and their different areas of responsibility.

- Senior managers- need information that oversees the entire organisation
- Middle managers- require more detailed information about their area of responsibility
- Operational managers- need information that help them manage day to day operations to ensure target performance is met (deals directly with customers)

Management accounting VS financial accounting

1. Management accounting information is provided to managers and employees within the organisation, whereas financial accounting information is provided to interested parties outside the organisation (shareholders, creditors, banks, stock exchange, trade unions).
2. Management accounting reports are unregulated, whereas financial accounting reports are legally required and must conform to Australian accounting standards and corporations law.
3. The primary source of data for management accounting information is the organisation's basic accounting system, plus data from many other sources (financial and non-financial-work processes, committed customers and suppliers). The primary source of data for financial accounting information is almost exclusively the organisation's basic accounting system, which accumulates financial information.
4. Management accounting reports often focus on sub-units within the organisation, such as departments, divisions, geographical regions or product lines. These reports are based on a combination of historical data, estimates and projections of future costs. The data may be subjective and there is a strong emphasis on reporting information that is relevant and timely. Financial accounting reports tend to focus on the enterprise in its entirety. These reports are based almost exclusively on verifiable transaction data. The focus is often on reliability rather than relevance and the reports are not timely.
5. Costing systems are common in both management and financial accounting-system that estimates the cost of goods and services as well as the cost of organisational units, such as departments.

Management Accounting

Management accounting supports the organisations formulation and implementation strategy, it contributes to improving the organisations competitive advantage in terms of quality, delivery time and cost though modern process improvement and cost management techniques.

Strategy formulation involves strategic or long-term planning it involves choosing the most appropriate business methods in-conjunction with organizational goals and objectives

Strategy implementation involves planning and managing the carrying out of strategies by putting in place systems and structures to support those strategies, such as setting up new business units, implementing new production processes

A management accountant might provide the following types of information to assist management in a business that considered customer service to be of key strategic importance:

- analysis of customer needs, inquiries and complaints
- measures of customer response time
- number of new customers
- customer retention rate
- customer satisfaction with service
- customer profitability analysis
- market share.

Management accounting and strategy

- Vision- desired future state of the organisation. Used by senior managers to focus the attention and energies of staff
- Mission statement Defines the purpose and boundaries of the organisation example “delivering the best retail experience or contributing to the community”
- Objectives(goals)- Specific statement of what the organisation aims to achieve, often measured and relating to a specific period of time. Example: increase product quality, increased quality of service, environmental responsibility.
- Strategies- the direction that the organisation intends to take over the long term to meet its mission and achieve its objectives.

Formulating strategies for organisations are based on:

what businesses will operate in- to answer this we use corporate strategy which is decisions about the types of businesses in which to operate, which businesses to purchase and deny and how best to structure and finance the organisation.

how they should compete- to answer this we look into competitive strategy- the way a business competes within its chosen market. This can mean having a competitive advantage over another business such as:

cost leadership- where a business sells its goods or services at a lower price than its competitors

product differentiation-when business offer products that have characteristics that are different from those that are offered by its competitors.

what systems and structures should be in place?- to answer this we look at strategy implementation- putting plans into place to implement and support a chosen business strategy.

Planning and controlling

Planning- a broad concept that is concerned with formulating the direction for future operations.

This can be seen in budget planning (short term detailed plan for a specific future time periods)

Controlling- putting mechanisms into place to ensure operations proceed according to plan. involves monitoring, comparing and correcting work performance. Control systems provide information to assist in managing the organisation.

Costing goods and services

Estimates of cost of producing goods and services are often needed to support a range of operational and strategic decisions. In some firms routine systems are established to estimate the cost of goods and services. Product costs are produced outside of the financial accounting systems, to better meet managers’ decision making needs (can contain information such as marketing, other product related costs)

Important considerations in management accounting systems

Behavioural issues- need to be cautious of the ways that information can impact individuals. For example reducing lunch size in McDonalds will this reduce customer satisfaction?

Motivating managers and employees- managers need to motivate employees so they strive to achieve organisational goals things such as well-done when employees do something right or giving them incentives (pay rises- using reward systems)

Cost and benefits of information- costs- purchasing systems to store information, managers time in reading big amounts of information can be stressful (unable to recognise important facts). Benefits include better decision making, effective planning, improved customer and shareholder value.

Contingency and institutional theory

Management accounting systems should be tailored to the needs of organisations.

- Contingency theory- the type of accounting and control system varies according to the specific circumstances or situations in which the organisation operates. It is influenced by a range of factors such as external environment, technology, structure, organisational size, national culture ect.
- Institutional theory-focuses on the deeper and more strong aspects of social structure. It considers the processes by which structures, including rules, norms, and routines, become established as authoritative guidelines for social behaviour. Example “accepted” accounting practices.

Conventional and contemporary management

Techniques have been developed over recent years, and support the adoption of new structures, systems and practices. Conventional management focused on budgeting, costing system and financial performance whereas contemporary management includes activity-based costing, balanced scorecards, business process reengineering, customer profitability analysis ect.

Professional Ethics

Code of Ethics for Professional Accountants, Issued by the Accounting Professional and Ethical Standards Board (APESB) CPAs and CAs are required to comply.

- Integrity- must be straightforward and honest (fair dealing)
- Objectively- must not compromise their professional judgement
- Confidentiality- must not disclose outside the firm
- Professional behaviour- comply with relevant laws and regulations
- Professional competence and due care- must maintain professional knowledge and skill at the level required.

Chapter two – management accounting: cost terms and concepts

Components of a management accounting system

- Costing system- estimates the cost of goods and services as well as the cost of organisational units such as departments
- Budgeting system- used to prepare a detailed plan which shows the financial consequences of the organisations operating activities for a specific future time period. (the system estimates planned revenues and expenses)
- Performance system- measures performance by comparing actual results with target results.
- Cost management system- focuses on improving the organisations cost effectiveness through understanding and managing the real causes of cost.

Conventional versus contemporary approaches to management accounting

Conventional

- Costing system- estimates cost of organisational units-assumes that production volume is the only factor that can cause cost
- Budgeting system-estimates planned revenues and costs for organisations units (departments). For overall organisation budget department budgets are added together
- Performance measurement system- provides measures of financial performance. Focus mainly on controlling costs by reporting actual results and budgeted results.
- Cost management system-provides information to help management control cost by focusing on differences of budget cost and actual costs.

Contemporary (today)

- Costing system- more detailed- they estimate the cost of individual activities performed in the organisation and use this information to cost goods and services, they realise that production volume can cause cost to change.
- Budgeting system- budgeting uses the same approach- it is more detailed as it sections on an activity based.
- Performance measurement system-provides measures across a whole range of factors (quality, delivery, innovation and sustainability as well as financial performance) contemporary measurement looks at what happens within and outside the organisation.
- Cost management system- system is designed not only to control costs but also to reduce them (wasteful activities are identified and eliminated and cost are analysed to identify their real root cause.

Emphasis on cost

Costs are an important source of information for managers. management decisions generally cause costs. Managers need to understand cost causes to plan and control. They need to identify costs to create customer values and shareholder wealth.

- Non-financial information is also needed to help make decisions- these are things that are outside the organisation such as other business structures, customer demands, how long delivery is taking, is current staff being trained well to do their jobs accordingly.

Accountants focus on costs as when costs are incurred they are stored in the accounting system for example purchasing raw material from a supplier is recorded as inventory. Accountants focus on cost as they need to value inventory (at production cost) and determine cost of goods sold.

Cost classification: different classification for different purposes

Management need to understand the different ways costs can be classified, analysed and reported. Different classifications are used for different purposes – short-term versus long term decisions. The same cost can be classified in a number of ways depending on its intended use. For example when determining the profitability of bread we have to determine the costs that are involved in making the bread and costs that relate to the bread. Must determine which cost concepts are most appropriate in each situation.

Benefits of measuring and classifying costs can be realised through improvements in the quality of managers' decisions. However, costs can include: Information overload can occur when managers receive more information than they can use efficiently.

The value chain

starts of from the moment a customer places an order to an organisation and is a continual process of activities that allows inputs (raw materials) to be formed into outputs (finished product.) it provides a useful framework in determining where costs are incurred within the business.

The value chain has 3 main links:

- 1 upstream value chain- research and development as well as product design.
- 2 internal value chain- manufacturing and production costs (inputs to outputs).
- 3 downstream value chain- delivering final product to the customer.

What are costs?

Costs are the resources given up to achieve a particular objective. Benefits that extend beyond the current reporting period are assets- measures future benefit of costs (prepaid rent). Expenses are a cost used up in the generation of revenue (accrued wages)- written off in the period in which they occur.

Classifying costs according to their behaviour

- Variable costs change when activity changes.
- Fixed costs remain unchanged when activity changes.

We need to know the behaviour of costs as it will make budgeting easier and also controlling the costs easier if you know what variables is driving them. Drivers of cost can be seen:

Cost Driver Examples

<u>Activity</u>	<u>Cost Driver</u>
Machining operations	Machine hours
Setup	Setup hours
Production scheduling	Manufacturing orders
Inspection	Pieces inspected
Purchasing	Purchase orders
Shop order handling	Shop orders
Valve assembly support	Customer requisitions

Direct and indirect costs

it is important for management to measure cost objectives. A cost object is any item such as products, customers, departments, projects, activities, and so on, for which costs are measured and assigned. Example: A surfboard is a cost object when you are determining the cost to produce a surfboard. Costs can be classified as direct and indirect.

- Direct cost- a cost that can be identified with or traced to a particular cost object in an economic manner
- Indirect cost- a cost that cannot be identified with or traced to a cost object in an economic manner

How manager may trace costs

Traceability is the ability to assign a cost to a cost object in an economically feasible way by means of a cause-and-effect relationship. Managers can either directly trace a cost – cost is from the cost object itself or they can driver trace- cost is from the cost driver.

Direct and indirect costs of a responsibility centre

A responsibility centre is a sub-unit of an organisation where the manager is held accountable for the sub-unit's activities and performance. For example revenue centres and cost centres. employees' wages can be directly related back to the organisations cost.

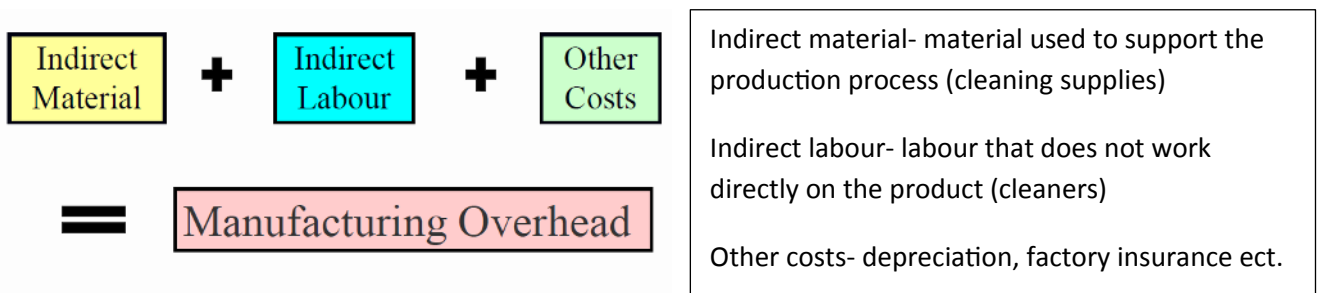
Controllable and uncontrollable costs

Performance can be enhanced by classifying costs as controllable or uncontrollable. For example department costs (are they controllable by the manager or not?). controllable cost- are cost that the manager can significantly influence or control. Uncontrollable costs are costs the manager cannot influence or control. Managers should only be held responsible for costs that they are in control of.

Manufacturing costs

Manufacturing cost is the cost of direct material, direct labour and manufacturing overheads.

- Direct material- the cost of materials consumed in the manufacturing process to produce a product, physically incorporated in the product and is able to be traced to the product in an economic manner.
- Direct labour- the cost of salary, wages and labour on cost for workers who work directly on the manufactured product.
- Manufacturing overhead- manufacturing overhead- (indirect manufacturing costs) is all costs incurred outside of manufacturing (cost of upstream and downstream activities)



Product costs for financial accounting reports

- Product costs – the cost assigned to goods that were either manufactured or purchased for resale - regarded as assets (inventory) until sold.
- Cost of goods sold (COGS)- the cost of a product when it is sold.

- Period costs - all costs which are not product costs, expensed in the accounting period in which they are incurred.
- Selling costs and administrative costs – the cost of selling and distributing the firms goods and services and cost of running a business as a whole- regarded as period costs

Managers need to know the costs involved in a product cost when setting the price in which to sell the product.

Cost flows in a manufacturing business

There are 4 steps involved in the flow of costs in manufacturing:

1. Raw materials is purchased (added to raw material inventory) this account records all major materials purchased for a manufacturing company
2. Direct material is consumed in production, its cost is removed from raw material and added to work in process- records the cost of manufactured products that are only partially completed at balance date.
3. When products are completed they are transferred from work in process to finished goods inventory (records goods that are ready for sale).
4. When products are sold the cost of the finishes goods are transferred to cost of goods sold account which is an expense during the time the sale is made.

Formulas

Cost of goods manufactured (COGM) = Beginning WIP + Total manufacturing costs - ending WIP

Total manufacturing costs = Raw materials used + Direct labour + Applied Manufacturing overhead

COGS = Beginning finished goods inventory + Cost of Goods Manufactured - ending finished goods inventory

Chapter three – Cost drivers, cost behaviour and cost estimation

What are cost behaviour, cost estimation and cost prediction?

Cost behaviour-the relationship between the cost and the level of activity

Cost estimation- the process of determining the cost behaviour of a particular item

Cost prediction- using knowledge of cost behaviour to forecast the level of cost at a particular level of activity.

Cost drivers

Cost drivers is any activity or factor that causes costs to be incurred. For example the number of paint brushes produced at rockstar drives the cost of setting up the machines to make the brushes.

Most accountants assume that sales volume (production volume) is the only cost driver for example the greater amount of bread produced the greater the cost of the ingredients will be.

- Volume based cost driver-a cost driver that assumes that the costs are driven or caused by sales volume (production volume)
- While accountants believe sales volume is the driver of cost there are also many other important cost drivers to consider- non volume based cost driver- a cost driver not directly related to production volume. For example the amount of deliveries for bread does not depend on the amount of bread produced as deliveries occur at different times and days to different shops and in different loads.

A contemporary view of cost and cost drivers

Activity-based costing classifies costs and cost drivers into 4 distinct categories:

- unit level cost– cost relating to the activities performed for each unit such as direct material cost
- batch level cost –cost relating to the activities performed for a group of product units, such as batch or a delivery load
- product level cost- cost relating to activities performed for specific products or product families (new product line)
- facility level costs - costs incurred to support the whole business not caused by a particular product.

Selecting the best cost drivers

Input or output measure?

For example when doing a delivery the input would be the amount of petrol to run the car and the output would be the amount of deliveries made. Another example may be input includes ingredients for bread and output is the number of bread rolls made.

To predict costs accurately there should be strong correlation between cost and cost driver, the cost driver must be easy to measure.

Level of detail?

As the number of cost categories increase, the accuracy of the resulting information will increase. With more cost drivers, the cost of gathering and analysing information about costs and costs drivers will also increase. (cost categories increase, increase information accuracy, increase in costs)

Long-term or short-term perspective?

cost behaviour and cost drivers can change overtime cost the may appear fixed in the short term can vary in the long term. For example the rental for shop A may be 1000 per week for the first 1 year however it may increase in the following year.

Cost estimation or cost management

Businesses can manage costs by managing their cost drivers

- Effective cost management involves the identification of *root-cause drivers* the underlying factor that causes a cost to be incurred for example the amount of ingredients used to make bread- are these ingredients been utilized if not is it due to poor production processes? Or what is causing electricity to be high (are the ovens operating on inefficient energy?)

Cost behaviour patterns

Cost behaviour is the relationship between a cost and the level of activity or cost driver. To understand cost behaviour patterns we examine:

A Cost function can be used to describe cost behaviour: $Y = a + bX$ where a is the fixed cost and bX is variable costs.

- Variable costs
Costs that change due to the change in activity for example your total STD/ISD telephone call is billed based on how many minutes you talk.
- Fixed costs
Costs that remains unchanged in total despite the level of activity. For example your monthly rental on your telephone account does not vary with the number of phone calls.
- Step-fixed costs – fixed over a range of activity, but jumps to a different amount for levels outside that range. For example when buying a rental property a house of 0- 30 squares cost 50,000 where as a house of 30-60 squares cost 75,000 and a house of 60-90 squares cost 110,000
- Semi-variable costs –costs that consist of both fixed and variable components. For example the cost of operating delivery trucks they have a fixed cost (hiring the trucks) and variable cost of the number of deliveries made by the truck.
- Curvilinear costs – costs that can be described a curved line (economic cycle). For example the higher the inflation the higher the unemployment rate.

Engineered, Committed and Discretionary Costs

When management estimates cost for budgets it is good to distinguish between:

- Engineered costs-costs that have a clear relationship to output- for example direct materials
- Committed cost- costs resulting for organisations basic structure and facilities which is difficult to change in the short term.- example depreciation for building and equipment.
- Discretionary cost- costs resulting from management decision to spend money for some purpose- example advertising/ research/ development.

Shifting Cost Structure in the New Manufacturing Environment

More organisations are finding out that costs no longer vary with the volume of production because:

Increased automation-they rely more on equipment rather than direct labour

Stable workforce- labour unions negotiate enterprise agreements, management is less able to change employment levels when activity level changes.

Cost Behaviour in Other Industries

Cost behaviours vary depending on the activities that industries do. For example in a theatre rent is a variable cost because it depends on the amount of people that occupy the seats and the labour is a fixed cost (the members that performing in the show). This is usually opposite from most businesses where rent is usually a fixed cost.

Cost estimation

Cost estimation is the process of determining the cost behaviour pattern of a cost item. There are three approaches to cost estimation:

managerial judgement

when managers use their experience to estimate costs behaviours rather than formal analysis. This approach is called account classification method- managers use their judgement to classify costs as fixed, variable or semi-variable.

engineering approach

Cost estimation from the study of processes that result in the incurrence of a cost. *engineering studies* - focus on the relationships that should exist between inputs and outputs. *time and motion studies* (task analysis or work measurement) - observation of the steps required and time taken by employees to perform particular activities.

Activity-based approaches extend task analysis to the study of indirect activities and costs.

quantitative analysis

The analysis of past data to identify relationships between costs and activities. Past data is useful in a stable environment however it may not help in a continuously developing environment. Three approaches include:

- visual fit method- fitting a line on a scatter diagram to estimate the cost function. Scatter diagrams are useful to see the significance of the relationship between cost and level of activity it also allows to identify an possible outliers. However this methods is not so reliable as lines can be drawn from any point on the graph.
- high-low method Estimate a cost function by considering data at the highest and lowest levels of activity (only uses 2 data points).

$$\text{Variable cost} = \frac{\text{difference in cost levels}}{\text{difference in activity levels}}$$

- regression analysis- statistical analysis used to estimate the relationship between a dependent variable (Y- cost) and independent variable (X-cost driver). It uses all available data in defining the line of best fit ($y=ax+b$). a multiple regression ($y= ax+bx^2+c$) is a relationship between the dependent variable and 2 or more independent variables.

Data collection problems

Regardless of the methods used there will be problems

- missing data-misplaced source documents or failure to record accurately
- outliers-can be eliminated due to analysis
- mismatched time periods- variables may be measured at different time periods. Like bread is measured on a daily basis whereas electricity is monthly
- inflation- current costs may not reflect future costs
- allocated fixed costs- fixed cost may be measured per unit this may be misleading and obtained as a variable cost.
- trade-offs in choosing time periods- when predicting further to the future work techniques and technology may change.

Effect of learning on cost behaviour

- learning curve effect- the reduction in labour time per unit that occurs as labour forces gain experience in manufacturing a new product. This should be taken into account for relatively new product lines when estimating labour costs.

The accuracy of cost functions in businesses

It is important to understand cost behaviour however some accountants choose to ignore the basic principles in identifying and verifying cost functions. Businesses may choose to rely more on gut feeling than on objective techniques because:

- the accountant may not have time nor knowledge to use appropriate techniques
- the data required to estimate reliable cost functions may not exist
- low priority given to analysing cost behaviour and cost estimation
- approximations considered “accurate enough”

Chapter four – product costing systems

Product costing systems

A product costing system accumulates product related costs and uses a series of procedures to assign them to the organisations final products. Product related costs are the cost that have been incurred during the production process.

- Product costs are involved in external accounting reports as inventory is valued at its manufacturing cost
- Product cost also allow managers to make long term decisions such as which products to produce, what price to sell the products at.
- Product costs can include the manufacturing, marketing, selling and distribution and customer service cost associated with the product (value chain).

- Managers must determine if the product cost is set for current or future cost, for example when setting a selling price Is the manager setting it to cover future product costs or current product costs. Current cost must also take into consideration the effects of inflation.



- Managers should choose to monitor product profitability on a regular basis.

Types of product costing systems

The type of product system that is used depends on the business structure and what products a business is selling.

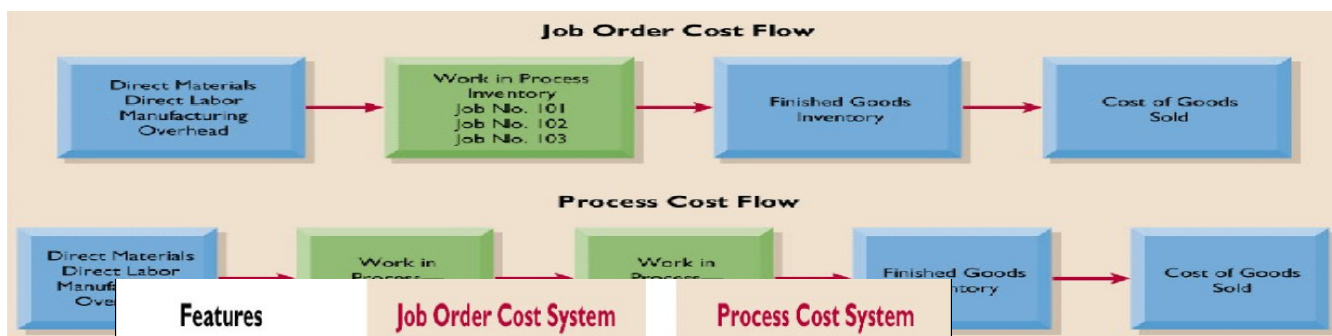
Job costing systems

A costing system that assigns manufacturing (or product related cost) to individual jobs. This system is designed for businesses that use a wide range of products for example car parts, custom designed homes, wedding invitations. Each distinct product undertaken to fill a particular customer order is called job (or job order).

Process costing system

A costing system that assigns all production costs to processes or departments and averages them on all units produced. This system is designed for similar products or a bulk of the same products. For example food industries, petrol industry and electricity industries use process costing. A processing system involves 2 main steps:

- Estimating the cost of the production process
- Calculating the average cost per unit by dividing the cost of the process by the number of units produced.



Features	Job Order Cost System	Process Cost System
Work in process accounts	• One for each job	• One for each process
Documents used	• Job cost sheets	• Production cost reports
Determination of total manufacturing costs	• Each job	• Each period
Unit cost computations	• Cost of each job ÷ Units produced for the job	• Total manufacturing costs ÷ Units produced during the period

Job costing VS process costing

Job Cost Sheet			
Job No. _____	Quantity _____		
Item _____	Date Requested _____		
For _____	Date Completed _____		
Date	Direct Materials	Direct Labor	Manufacturing Overhead
Cost of completed job			
Direct materials	\$ _____		
Direct labor	_____		
Manufacturing overhead	_____		
Total cost	\$ _____		
Unit cost (total dollars ÷ quantity)	\$ _____		

warehouse to the production department.
(dr work in process, cr raw material inventory)

- When using indirect material (manufacturing overheads)- dr manufacturing overhead, cr raw materials or wages payable (or the relevant account)
- A time sheet is used to record the amount of labour time spent on each job or activity. (dr work in process, cr wages payable)

Accounting for manufacturing overheads

Manufacturing overheads that have occurred in production:

Job costing systems

- A job cost sheet is used to record all the costs that are related to a particular job.
- A bill of materials is a list of materials required for a job. When purchase of material occurs. (dr raw materials, cr accounts payable)
- A material requisition form authorises the movement of raw materials from the

Wallace Manufacturing Company Materials Requisition Slip				
Deliver to:	Assembly Department		Req. No.	R247
Charge to:	Work in Process – Job No. 101		Date	1/6/96
Quantity	Description	Stock No.	Cost Per Unit	Total
200	Handles	AA2746	\$5.00	\$1,000
Requested by: _____ Received by: _____				
Approved by: _____ Costed by: _____				

Wallace Manufacturing Company Time Ticket				
Employee	John Nash		Date:	1/6/99
Charge to:	Work in Process		Employee No.	124
			Job No.	101
Time			Hourly Rate	Total Cost
Start	Stop	Total Hours		
0800	1200	4	10.00	40.00
Approved by <u>Bob Kallier</u>			Costed by <u>M. Chen</u>	

Dr Manufacturing overhead xxx
 Cr Prepaid rent xxx
 Cr Depreciation on equipment xxx
 Cr etc..... xxx

Application of manufacturing overhead

The application of overhead to the firms products can be based on a predetermined overhead rate:
 Can be calculated as: budgeted total manufacturing overhead for coming year divide by budget total direct labour for coming year. This gives the hourly rate for direct labour.
 For example $1000 / 50000 = \$20$ per direct labour. This \$20 is then times with the direct labour hours to give you the manufacturing overhead applied

Dr Work in Process Inventory xxx
 Cr Manufacturing overhead xxx

What is the point of estimating manufacturing overheads?

Actual overhead for the period is not known until the end of the period. Some of the overhead costs cannot be traced directly to the product produced or service provided. Using a predetermined rate makes it possible: to estimate total job costs sooner, and to enable cost control.

Completion of a production job

Dr Finished Goods inventory xxx
 Cr Work in Process Inventory xxx

Sale of goods

Dr Account Receivable xxx
 Cr Sales revenue xxx

and

Dr Cost of Goods Sold xxx
 Cr Finished Goods Inventory xxx

Under applied overhead

Assigned (estimated) costs less than actual costs incurred;

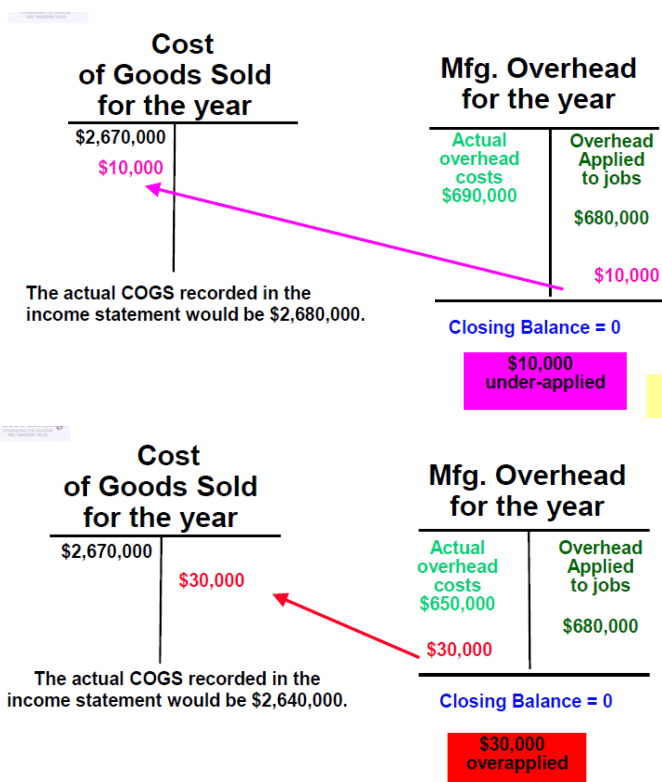
Dr Cost of Goods Sold xxx
 Cr Manufacturing Overhead xxx

Over applied overhead

Assigned (estimated) costs is more than actual costs incurred;

Dr Manufacturing Overhead xxx
 Cr Cost of Goods Sold xxx

Chapter five – process costing and operation costing



Operation costing system

- Commonly used when batches of many different products pass through the same processing department.
- It assigns direct material costs to individual batches (as in job costing), and conversion costs to departments (as in process costing)
- Conversion costs are applied to products using a predetermined application rate.

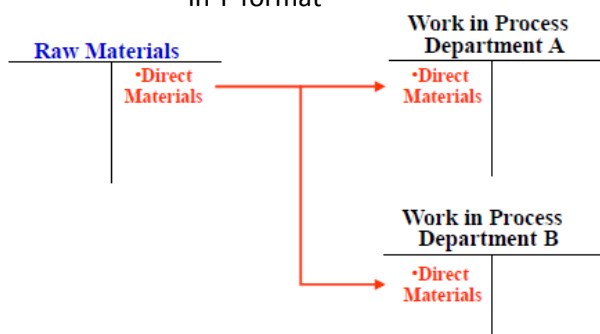
Nature of process costing

Process costing is a system that assigns all production costs to processes or departments and averages them across all units produced. The steps involved in process costing include:

- Analyse the physical flow of units (beginning work in process+ physical units started- physical units completed and transferred out = ending work in process)
- Calculate the equivalent units (for direct material and conversion)- equivalent units completed and transferred out + equivalent units in ending work in process = total equivalent units.
- Calculate unit costs (cost per unit for direct material and conversion costs)
- Analyse the total costs

Record the use of direct materials (raw materials decrease)

In T-format

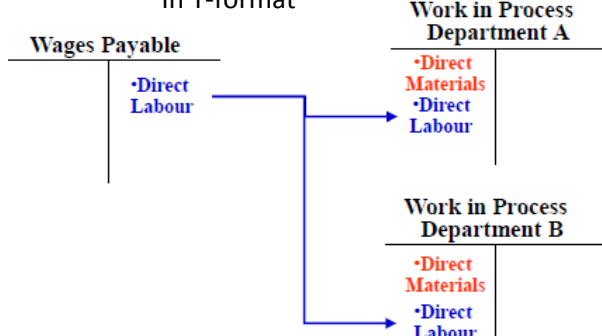


General journal entry

Date	Description	Post. Ref.	Debit	Credit
	Work in Process - Department A		XXXX	
	Work in Process - Department B		XXXX	
	Raw Materials			XXXX
	<i>To record the use of direct material.</i>			

Record direct labour costs

In T-format

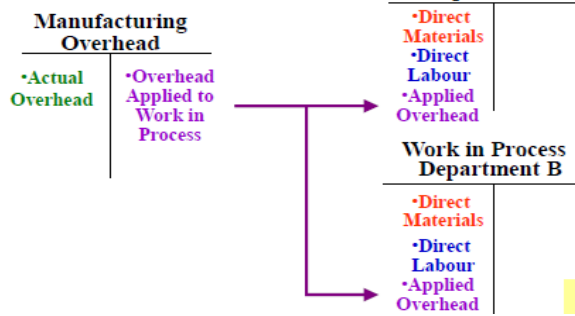


General journal entry

Date	Description	Post. Ref.	Debit	Credit
	Work in Process - Department A		XXXX	
	Work in Process - Department B		XXXX	
	Salaries and Wages Payable			XXXX
	<i>To record direct labour costs.</i>			

Apply manufacturing overhead to production

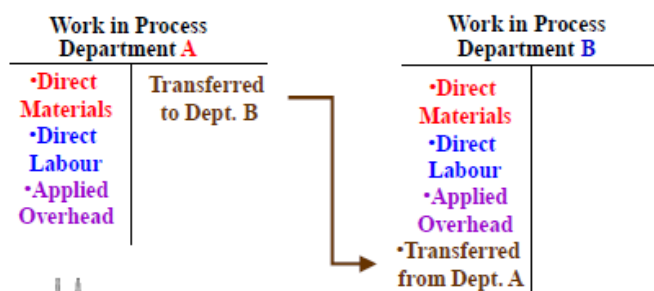
In T-format



General journal entry

Date	Description	Post. Ref.	Debit	Credit
	Work in Process - Department A		XXXX	
	Work in Process - Department B		XXXX	
	Manufacturing Overhead			XXXX
	<i>To apply overhead to departments.</i>			

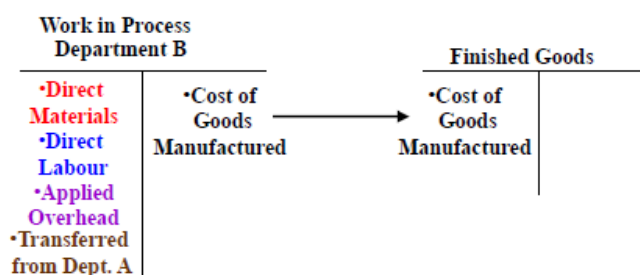
Transferring department A to B



Date	Description	Post. Ref.	Debit	Credit
	Work in Process - Department B		XXXX	
	Work in Process - Department A			XXXX
	To record the transfer of goods from Department A to Department B.			

Record the completion of goods (transfer from department B to finish goods)

In T-format



General journal entry

Date	Description	Post. Ref.	Debit	Credit
	Finished Goods		XXXX	
	Work in Process - Department B			XXXX
	To record the completion of goods and their transfer from Department B to finished goods inventory.			

Equivalent unit costs

For the current period, Jones started 15,000 units and completed 10,000 units, leaving 5,000 units in process 30 percent complete. How many equivalent units of production did Jones have for the period?

- 10,000
- 11,500
- 13,500
- 15,000

Equivalent units= units completed and transferred out + ending work in process.

$$EU = 10,000 + (.3)(5,000) = 11,500$$

$$\text{Cost per equivalent unit} = \frac{\text{Costs for the period}}{\text{Equivalent units for the period}}$$

Calculation of work in process

when calculating WIP, It can be calculated in 2 ways:

- Weighted average method**- cost of opening WIP inventory and current production costs are averaged to determine the cost per equivalent unit, subsequently, the cost of completed production and closing WIP.
- FIFO (first in, first out) method**- assumes that the oldest inventory is completed before new production commences. Under FIFO, the cost per equivalent unit and the cost of closing WIP are based on costs incurred during the current month

Weighted average method example (working out the equivalent units)

The second step is to identify the *equivalent units* of production in *ending work in process* with respect to *materials* for the month (160 units) and add this to the 4,800 units from step one.

	Materials	Conversion
Units completed and transferred to the next department	4,800	4,800
Work in process, May 30:		
400 units × 40%	160	
Equivalent units of Production in during the month of May	4,960	

The first step in calculating the equivalent units is to identify the units completed and transferred out of the Department in May (4,800 units)

The third step is to identify the *equivalent units* of production in *ending work in process* with respect to *conversion* for the month (100 units) and add this to the 4,800 units from step one.

	Materials	Conversion
Units completed and transferred to the next department	4,800	4,800
Work in process, May 30:		
400 units × 40%	160	
400 units × 25%		100
Equivalent units of Production in during the month of May	4,960	4,900

Weighted average (applying the formula)

$$\text{Cost per equivalent unit} = \frac{\text{Cost of beginning work in process inventory} + \text{Cost added during the period}}{\text{Equivalent units of production}}$$

Notice – includes April costs in

May costs

	Total Cost	Materials	Conversion
Cost to be accounted for:			
Work in process, May 1	\$ 15,175	\$ 9,600	\$ 5,575
Costs added in the Shaping and Milling Department	719,500	368,600	350,900

Shaping and Milling Department Cost of Ending Work in Process Inventory and the Units Transferred Out			
	Materials	Conversion	Total
Ending work in process inventory:			
Equivalent units of production	160	100	
Cost per equivalent unit	\$ 76.25	\$ 72.75	
Cost of ending work in process inventory	\$ 12,200	\$ 7,275	\$ 19,475
Units completed and transferred out:			
Units transferred to the next department	4,800	4,800	
Cost per equivalent unit	\$ 76.25	\$ 72.75	
Cost of units transferred out	\$ 366,000	\$ 349,200	\$ 715,200

Shaping and Milling Department Cost Reconciliation			
Costs to be accounted for:			
Cost of beginning work in process inventory		\$ 15,175	
Costs added to production during the period		719,500	
Total cost to be accounted for		\$ 734,675	
Cost accounted for as follows:			
Cost of ending work in process inventory		\$ 19,475	
Cost of units transferred out		715,200	
Total cost accounted for		\$ 734,675	

Reconciling costs

FIFO method (calculation of equivalent units)

Shaping and Milling Department	Units	Percent Completed	
		Materials	Conversion
Beginning work in process	200	55%	30%
Units started into production in May	5,000		
Units completed during May and transferred to the next department	4,800	100%	100%
Ending work in process	400	40%	25%

Step 1: Determine equivalent units needed to complete beginning inventory.

	Materials	Conversion
To complete beginning work in process:		
Materials: 200 units × (100% - 55%)	90	
Conversion: 200 units × (100% - 30%)		140

Step 2: Determine units started and completed during the period.
Step 3: Add the equivalent units in ending work in process inventory.

FIFO (applying the formula)

$$\text{Cost per equivalent unit} = \frac{\text{Cost added during the period}}{\text{Equivalent units of production}}$$

	Total Cost	Materials	Conversion
Costs added in the Shaping and Milling Department	\$ 719,500	\$ 368,600	\$ 350,900
Equivalent units		4,850	4,840
Cost per equivalent unit		\$ 76.00	\$ 72.50
Total cost per equivalent unit = \$76.00 + \$72.50 = \$148.50			

Conversion: 400 units × 25% complete		100
Equivalent units of production	4,850	4,840

Reconciliation

Shaping and Milling Department Cost of Ending Work in Process Inventory and the Units Transferred Out			
	Materials	Conversion	Total
Units transferred out:			
Cost in beginning work in process (WIP)	\$ 9,600	\$ 5,575	\$ 15,175
Cost to complete beginning WIP:			
Equivalent units to complete	90	140	
Cost per equivalent unit	\$ 76.00	\$ 72.50	
Cost to complete beginning WIP	\$ 6,840	\$ 10,150	\$ 16,990
Cost of units started and completed in May			
Units started and completed in May	4,800	4,800	
Cost per equivalent unit	\$ 76.00	\$ 72.50	
Cost of units started and completed in May	\$ 364,800	\$ 348,000	\$ 712,800
Cost of units transferred out	\$ 431,240	\$ 403,725	\$ 834,965

Shaping and Milling Department Cost Reconciliation			
Costs to be accounted for:			
Cost of beginning work in process inventory		\$ 15,175	
Costs added to production during the period		719,500	
Total cost to be accounted for		\$ 734,675	
Cost accounted for as follows:			
Cost of ending work in process inventory		\$ 19,475	
Cost of units transferred out		715,200	
Total cost accounted for		\$ 734,675	

Value chain for manufacturing firms

Purchasing the goods for resale → sales of goods to customers → Marketing (advertising) → distribution (delivery of products) → customer support (provides after sale support)

When should firms estimate their service costs?

Costing systems must be tailored to fit an organisations production environment. We can identify 3 types of service organisations: costing systems allow service firms to accurately control future costs.

- Professional services- firms that are staffed by professionally qualified people who provide personal services and serve relatively few customers.
- Mass services- organisations that serve many customers with each one requiring limited staff time (staff is mainly non-professionals).
- Service shops- organisations that fit between professional and mass service entities in terms of number of customers, staff time and degree to tailor to needs. Deals with front office and back office operations.

Job costing systems for professional service firms

A costing system that assigns manufacturing costs to individual jobs. Since professional service firms deal with relatively few customer Labour cost can be traced directly to individual services in an economic manner. For example professional accounting service can be traced to labour using an hourly pay rate. A job billing may be used instead which suggest a pre-determined pay rate combined with allowance for overhead costs.

Process costing system for (some) mass services

A costing system that assigns all production costs to processes or departments and averages them across all units produced. Since mass services deal with a lot of customers, tracking costs to each service is difficult. For example in airports they provide a service to check-in luggage, dealing with mass amounts of customers. It shows the cost of luggage service per customer.

Hybrid costing system for service shops and (other) mass services

A costing system that has the features of two or more costing systems such as process and job costing. For example when a customer wants to take out a loan it is tailored for the need of the loan (house, car or hex fee) and also goes through a variety of processes (print of money, setting interest charge etc.)

Activity based costing for services

Assigns costs directly to service activities (allows labour and manufacturing overhead costs to be traced). For example Medicare established detailed rules regarding how overhead costs should be grouped into cost pools. Within these rules shift costs from general care to intensive care unit, the critical care unit, and surgery.

Why is it important to estimate service costs?

- A basis of setting fees. Sets a fee to cover all costs and make a profit margin
- To assess profitability of each service- to increase profitability and shareholder value
- To determine which services to promote and withdraw (which services are doing well)
- To control costs- to see where high costs are occurring and reduce them or prevent them in the next reporting period.

$$\text{Budgeted overhead rate} = \frac{\text{budgeted overhead}}{\text{budgeted direct professional labour}}$$

Adelaide Bank Ltd Income Statement for the year ended 30 June	
Operating revenue:	
Interest revenue on loans to customers	\$27 089 200
Other interest revenue	11 372 900
Other operating revenue	<u>1 778 900</u>
	40 241 000
Less Operating expenses:	
Interest expense on deposits	13 949 600
Other interest expense	1 941 900
Doubtful debts expense	1 907 900
Employee wages and benefits	11 724 200
Building occupancy	1 380 700
General administrative	1 973 000
Other	<u>162 200</u>
	<u>33 039 500</u>
Operating profit	7 201 500
Other expenses (net)	<u>126 600</u>

Financial Statements for Merchandising Businesses

Smashes Electrical Stores Ltd Income Statement for the year ended 30 June	
Sales	\$705 680 000
Cost of sales	<u>380 110 000</u>
Gross profit	\$325 570 000
Other expenses:	
Operating, general selling and administrative expenses	120 311 000
Interest expense	<u>527 000</u>
	125 581 000
Profit before income taxes	199 989 000
Income tax expense	<u>59 990 000</u>
Net profit	<u>\$139 999 000</u>

Smashes Electrical Stores Ltd Partial Balance Sheet at 30 June	
Current assets:	
Cash	\$ 564 000
Accounts receivable	24 195 000
Inventories	104 875 000
Prepaid expenses	251 500
Other	<u>730 000</u>
Total current assets	<u>\$137 955 000</u>

Service costs are usually not accounted for in ledgers whereas for manufacturing firms inventory must be accounted for in ledger and should be recognised with the lower of cost.

Chapter seven – A closer look at overhead costs

What are overhead costs?

Overhead costs are indirect product costs (all costs other than direct costs). Production costs which cannot be traced to individual products.

Allocating costs

Using a cost pool- costs are allocated to cost objects for example administration cost are allocated among number of employees, occupancy costs is allocated among floor area, information technology cost is allocated among number of computers ect.

Allocating overhead costs to products

- Allocating overhead cost using a plant-wide rate- A plant-wide rate is a single overhead rate that is calculated for the entire production plant:

$$\text{Predetermined manufacturing overhead rate} = \frac{\text{Budgeted manufacturing overhead}}{\text{Budgeted level of cost driver}}$$

$$\text{Applied overhead} = \text{Predetermined overhead rate} \times \text{Quantity of cost driver consumed by the product}$$

- Allocating overhead cost using department rates- overhead costs assigned to products VIA departments. For example:

Manufacturing Department	Budgeted Manufacturing Overhead \$	Budgeted Direct Manufacturing Labour-Hours
1	240,000	10,000
2	100,000	10,000

plant wide rate: $\frac{\$340,000}{20,000 \text{ direct labour hours}} = \$17 \text{ per direct labour hour}$

- The number of direct manufacturing labour hours required to manufacture each product is:

Manufacturing department	Product A	Product B
1	4	1
2		
Total	5	5

Total overhead applied to each unit of Product B = \$17 per direct labour hour x 5 direct labour hours = \$85 using plant-wide overhead rates.
 direct labour hour x 5 direct labour hours = \$85 using plant-wide overhead rates.

At the end of the year there were 200 finished units of A and 600 units of B. There is no work in process.

Manufacturing Department	Product A	Product B
Direct material	\$120	\$150
Direct labour	\$80	\$80
Overhead	?	?

department rate:

Overhead department 1= 240000/10000= \$24

Overhead department 2= 100000/10000= \$10

Manufacturing department	Product A (DLH)	Product B (DLH)
1	4 x 24= 96	1 x 24 = 24
2	1 x 10= 10	4 x10= 40
Total	\$106	\$64

Department overhead rate

	Product A	Product B
Direct material	120	150
Direct labour	80	80
Overhead	106	64
Manufacturing cost	\$306	\$294

plant-wide overhead rate

	Product A	Product B
Direct material	\$120	\$150
Direct labour	\$80	\$80
Overhead	\$85	\$85
Manufacturing cost	\$285	\$315

Budgeted versus actual costs

- Budgeted: calculated prior to the commencement of the current year
- Actual: calculated after the end of the year

When manager seek advice they use the budget that Provides better information for managers to plan and control their use of indirect resources

Why allocate costs to responsibility centres

- Helps managers understand the economic effects of their decisions
- Encourages a particular pattern of resource usage

Support departments

Provides support that facilitates the activities of production departments: when allocating support department cost it can be done with direct method and step down method.

- Direct method

	Support Departments		Production Departments	
	Cafeteria	Custodial	Machining	Assembly
Departmental costs before allocation	\$ 360,000	\$ 90,000	\$ 400,000	\$ 700,000
Number of employees	15	10	20	30
Square metres occupied	5,000	2,000	25,000	50,000

	Support Departments		Production Departments	
	Cafeteria	Custodial	Machining	Assembly
Departmental costs before allocation	\$ 360,000	\$ 90,000	\$ 400,000	\$ 700,000
Cafeteria allocation	(360,000)		144,000	
Custodial allocation		?	?	
Total after allocation	\$ 0			

$$\$360,000 \times \frac{30}{20 + 30} = \$216,000$$

	Support Departments		Production Departments	
	Cafeteria	Custodial	Machining	Assembly
Departmental costs before allocation	\$ 360,000	\$ 90,000	\$ 400,000	\$ 700,000
Cafeteria allocation	(360,000)		144,000	216,000
Custodial allocation		(90,000)	30,000	60,000
Total after allocation	\$ 0	\$ 0	\$ 574,000	\$ 976,000

$$\$90,000 \times \frac{50,000}{25,000 + 50,000} = \$60,000$$

Step method- using the same data as above

	Support Departments		Production Departments	
	Cafeteria	Custodial	Machining	Assembly
Departmental costs before allocation	\$ 360,000	\$ 90,000	\$ 400,000	\$ 700,000
Cafeteria allocation	(360,000)	60,000	?	?
Custodial allocation		?	?	?
Total after allocation	\$ 0			

$$\$360,000 \times \frac{10}{10 + 20 + 30} = \$60,000$$

	Support Departments		Production Departments	
	Cafeteria	Custodial	Machining	Assembly
Departmental costs before allocation	\$ 360,000	\$ 90,000	\$ 400,000	\$ 700,000
Cafeteria allocation	(360,000)	60,000	120,000	180,000
Custodial allocation		(150,000)	?	?
Total after allocation	\$ 0	\$ 0		

New total = \$90,000 original custodial cost plus \$60,000 allocated from the cafeteria.

	Support Departments		Production Departments	
	Cafeteria	Custodial	Machining	Assembly
Departmental costs before allocation	\$ 360,000	\$ 90,000	\$ 400,000	\$ 700,000
Cafeteria allocation	(360,000)	60,000	120,000	180,000
Custodial allocation		(150,000)	50,000	100,000
Total after allocation	\$ 0	\$ 0	\$ 570,000	\$ 980,000

$$\$150,000 \times \frac{50,000}{25,000 + 50,000} = \$100,000$$

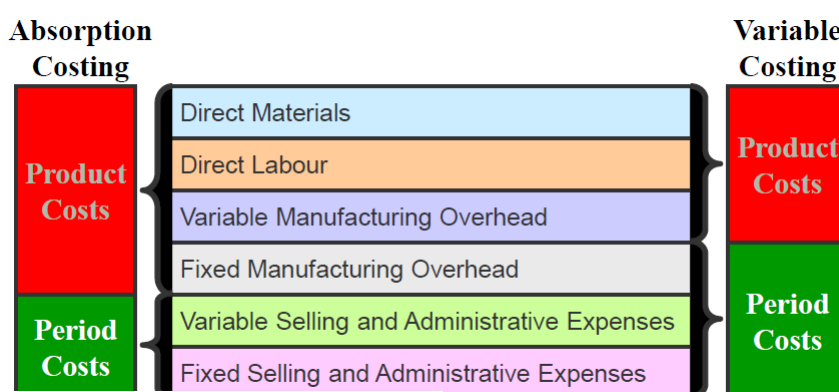
Chapter eight – absorption VS variable costing

Absorption and variable costing

- Absorption costing – where all manufacturing costs are assigned to products: direct material, direct labour, variable and fixed manufacturing overhead.
- Variable costing – where only variable costs are assigned to products: direct material, direct labour and variable manufacturing overhead.

Calculating profit under absorption costing

The income statement separates manufacturing costs from non-manufacturing costs.



Berry Company produces a single product which it sells at \$30 per unit. The following information relates to their costs:

Example:

Number of units produced annually	25,000
Variable costs per unit:	
Direct materials, direct labour and variable mfg. overhead	\$ 10
Selling & administrative expenses	\$ 3
Fixed costs per year:	
Mfg. overhead	\$ 150,000
Selling & administrative expenses	\$ 100,000

	Absorption Costing	Variable Costing
Direct materials, direct labour, and variable mfg. overhead	\$ 10	\$ 10
Fixed mfg. overhead (\$150,000 ÷ 25,000 units)	6	-
Unit product cost	\$ 16	\$ 10

Selling and administrative expenses are always treated as period expenses (not product costs). Never, ever included in COGS!!!

Absorption costing:

Berry Company had no beginning inventory, produced 25,000 units and sold 20,000 units this year.

Absorption Costing		
Sales (20,000 × \$30)		\$ 600,000
Less cost of goods sold:		
Beginning inventory	\$ -	
Add COGM (25,000 × \$16)	400,000	
Goods available for sale	\$ 400,000	
Ending inventory (5,000 × \$16)	80,000	320,000
Gross margin		\$ 280,000
Less selling & admin. exp.		
Variable (20,000 × \$3)	\$ 60,000	
Fixed	100,000	160,000
Net income		

Variable costing:

Variable Costing		
Sales (20,000 × \$30)		\$ 600,000
Less variable expenses:		
Beginning inventory	\$ -	
Add COGM (25,000 × \$10)	250,000	
Goods available for sale	\$ 250,000	
Ending inventory (5,000 × \$10)	50,000	
Variable cost of goods sold	\$ 200,000	
Variable selling & administrative expenses (20,000 × \$3)	60,000	260,000
Contribution margin		\$ 340,000
Less fixed expenses:		
Manufacturing overhead	\$ 150,000	
Selling & administrative expenses	100,000	250,000
Net income		\$ 90,000

Why is the end profit for absorption and variable costing different?

	Absorption Costing	Variable Costing	Difference
Profit	\$120,000	\$90,000	\$30,000

In absorption costing the fixed costs have been split up between COGS and ending inventory. The Fixed OH expensed is therefore 20000 units × \$6 unit = 120000, the Fixed OH left in ending inventory is \$6 unit × 5000 = \$30000

In variable costing the full fixed expense is expensed i.e.

Reconciliation of income under absorption and variable costing

Variable costing net income	\$ 90,000
Add: Fixed mfg. overhead costs	
deferred in inventory (5,000 units × \$6 per unit)	30,000
Absorption costing net income	\$ 120,000

Look at lecture extended example: lecture 8

Chapter eighteen– cost volume profit analysis

Cost volume profit analysis

A technique that is used to determine the effects of changes in an organisations sales volume on its costs, revenue and profit.

- Where profit= sales revenue- fixed cost- variable costs
- Fixed cost= sales volume* unit contribution margin
- Contribution margin= sales revenue- variable costs
- Unit Contribution margin= sales price per unit- variable cost per unit

Break-even point

The volume sales at which the total revenue and the total costs are equal and the firm breaks even (zero profits).

$$\text{Break -even point (in units)} = \frac{\text{Fixed expenses}}{\text{Unit contribution margin}}$$

Example:

	Total	Per Unit	Percent
Sales (500 surfboards)	\$ 250,000	\$ 500	100%
Less: variable expenses	150,000	300	60%
Contribution margin	\$ 100,000	\$ 200	40%
Less: fixed expenses	80,000		
Net income	\$ 20,000		

$$\text{Sales revenue} - \text{Variable expenses} - \text{Fixed expenses} = \text{Profit}$$

$$\begin{array}{rclcl} \downarrow & & \downarrow & & \\ (\$500 \times X) & - & (\$300 \times X) & - & \$80,000 = \$0 \\ (\$200X) & - & \$80,000 & = & \$0 \end{array}$$

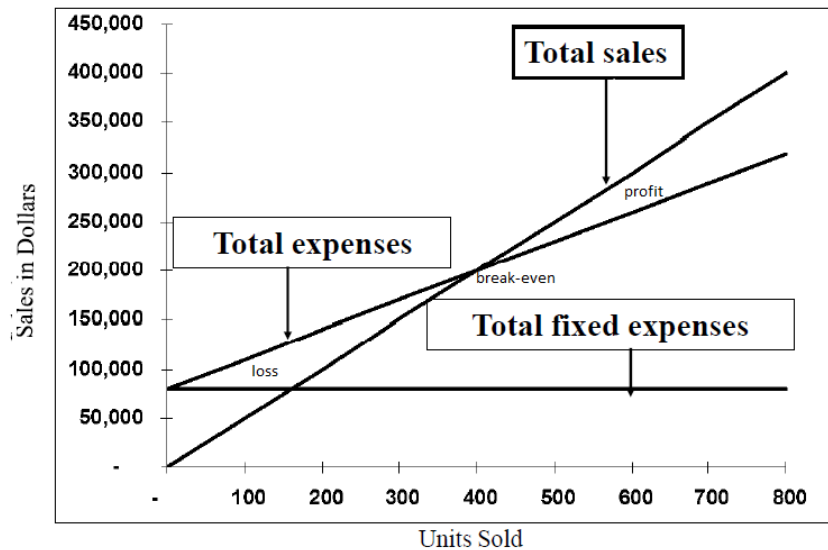
$$X = 400 \text{ units}$$

$$\text{Or break even} = \text{fixed expense} / \text{CM per unit}$$

$$= 80000/200 = 400 \text{ units}$$

Graphing cost volume profit

	Income 300 units	Income 400 units	Income 500 units
Sales	\$ 150,000	\$ 200,000	\$ 250,000
Less: variable expenses	90,000	120,000	150,000
Contribution margin	\$ 60,000	\$ 80,000	\$ 100,000
Less: fixed expenses	80,000	80,000	80,000
Net income (loss)	\$ (20,000)	\$ -	\$ 20,000



Target profit

The amount of units the organisation needs to sell in-order to reach their desired profits.

$$\frac{\text{Fixed expenses} + \text{Target profit}}{\text{Unit contribution margin}} = \text{Units sold to earn the target profit}$$

Looking at the previous example for the firm to earn a profit of 100000:

$$\begin{aligned}
 &\text{Sales revenue} - \text{Variable expenses} - \text{Fixed expenses} = \text{Profit} \\
 &\quad \downarrow \qquad \qquad \downarrow \\
 &(\$500 \times X) - (\$300 \times X) - \$80,000 = \$100,000 \\
 &\qquad \qquad \qquad (\$200X) = \$180,000 \\
 &\qquad \qquad \qquad X = 900 \text{ units}
 \end{aligned}$$

Using CVP for management decision making

- Safety margin- the difference between the budgeted sales revenue and the break even sales revenue. Gives an indication of how much sales can drop before losses are made.

Curl, Inc. has a break-even point of \$200,000. If actual sales are \$250,000, the safety margin is \$50 000

- Changes in fixed costs- fixed costs are only fixed in the short term they can change over the long term. When fixed cost change this will also change the breakeven point for the business. (Increases in fixed costs leads to increase in breakeven). Also an increase in sales price will reduce the breakeven point.

Example:

- Curl is currently selling 500 surfboards per month.
- The owner believes that an increase of \$10,000 in the monthly advertising budget, would increase surfboard sales to 540 units.

Should we authorise the requested increase in the advertising budget?

	Current Sales (500 Boards)	Proposed Sales (540 Boards)
Sales	\$ 250,000	\$ 270,000
Less: variable expenses	150,000	162,000
Contribution margin	\$ 100,000	\$ 108,000
Less: fixed expenses	80,000	90,000
Net income	\$ 20,000	\$ 18,000

Sales will increase by \$20,000, but net income will decrease by \$2,000.

ACC

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Predicting profit in the coming year

In the coming year, Curl's owner expects to sell 525 surfboards. The unit contribution margin is expected to be \$190, and fixed costs are expected to increase to \$90,000.

$$\text{Total contribution} - \text{Fixed cost} = \text{Profit}$$

$$(\$190 \times 525) - \$90,000 = X$$

$$X = \$99,750 - \$90,000$$

$$X = \$9,750 \text{ profit}$$

organisation

- Weighted average unit contribution margin- the average of the products' unit contribution margins, weighted by the sales mix

Different products have different selling prices, cost structures, and contribution margins.

CVP with multiple products

- Sales mix- reflects the relative proportions of each type of product sold by the

Example:

Description	Selling Price	Unit Variable Cost	Unit Contribution Margin	Number of Boards
Surfboards	\$ 500	\$ 300	\$ 200	500
Sailboards	1,000	450	550	300
Total sold				800

$$\text{Break-even point} = \frac{\text{Fixed expenses}}{\text{Weighted-average unit contribution margin}}$$

When fixed cost isn't given you can work it out this way:

Sales revenue	
Surfboards (500*500)	250000
Sailboards (1000*300)	300000
Less variable costs	
Surfboard (300*500)	150000

$$\begin{aligned} \text{Fixed cost} &= \text{sales volume} * \text{unit contribution margin} \\ &= 500 * 200 \\ &+ 300 * 550 \\ &= 100000 + 165000 = 265000 \end{aligned}$$

Sailboards (450*300)	135000	<u>285000</u>
Total contribution margin		<u>265000</u>
Less fixed cost		265000
Profit		0

Weighted average unit contribution margin:

Surfboard	200*62.5%= 125
Sailboard	550* 37.5%= 206.25
Total	<u>331.25</u>

Breakeven:
265000/331.25= 800

Description	Number of Boards	% of Total
Surfboards	500	62.5% (500 ÷ 800)
Sailboards	300	37.5% (300 ÷ 800)
Total sold	800	100.0%

Effects of income taxes

Sales volume required to earn target after - tax profit

$$= \frac{\text{Fixed expenses} + \frac{\text{target net profit after tax}}{(1 - t)}}{\text{Unit contribution margin}}$$

To earn an after-tax profit of \$100,000 at a tax rate of 40%, you would be required to earn \$166,667 (\$100,000/(1-0.4)) before tax

The number of surfboards:

$$\frac{\$80,000 + \$166,667}{\$200} = 1,234 \text{ surfboards}$$

volume varies

- Total cost curve is also linear- cost can be classified as fixed, variable or semi variable
- Labour, technology and market conditions do not change
- There is no capacity changes during the period

CVP and planning for businesses

- Sensitivity analysis- examines how an outcome may change due to variations in the predicted data
- Goal seeking approaches- the analyst specifies the outcome, so that software can specify the necessary inputs to achieve the outcome.
- What-if analysis - the analyst specifies changes in assumptions to examine the effect of these changes on outcomes

Measuring operating leverage

Operating leverage is the extent to which an organisation uses fixed cost in its cost structure.

$$\text{Operating leverage factor} = \frac{\text{Contribution margin}}{\text{Net income}}$$

$$\text{Sales revenue} - \text{Variable expenses} - \text{Fixed expenses} = \text{Profit}$$

$$\begin{array}{c} \downarrow \qquad \qquad \downarrow \\ (\$500 \times X) - (\$300 \times X) - \$80,000 = \$166,667 \end{array}$$

$$(\$200X) = \$246,667$$

$$X = 1,234 \text{ units}$$

Assumptions underlying CVP

- Total revenue is a linear line- suggest that selling price will not change as sales

	Actual sales 500 Boards
Sales	\$ 250,000
Less: variable expenses	150,000
Contribution margin	\$ 100,000
Less: fixed expenses	80,000
Net income	\$ 20,000

This gives an operating leverage of:

Percent increase in sales		10%
Operating leverage factor	×	<u>5</u>
Percent increase in profits		<u><u>50%</u></u>

$$100000/20000 = 5$$

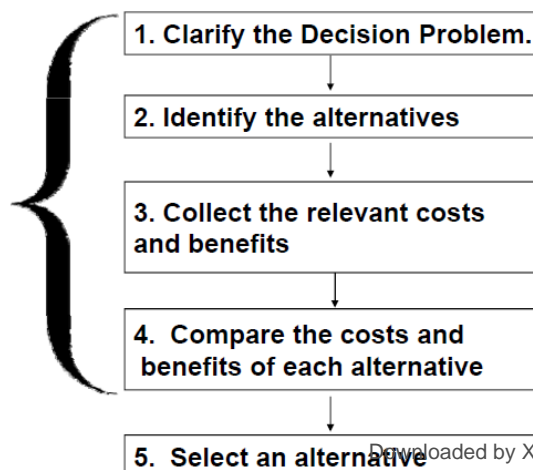
You can look at extended lecture example: lecture 10

Chapter nineteen– information for tactical decision making

The management accountants role in decision making

Management accountants play a critical role in providing relevant information to managers to help them in their decision making process on how to run an organisation. Decision include accept or reject a special offer, make or buy (outsourcing) a product, add or delete a product service or department and joint products: sell or process further.

Decision making process



Relevant information

Information that is relevant (information that correlated with current events), accurate and timely (available in time for decision making). In relevant information opportunity cost are taken into consideration however sunk costs are ignored as they have already been incurred and are irrelevant for future decision making.

Incremental and avoidable costs

- Incremental costs- the additional costs that arise from choosing one course of action over another
- Incremental revenue- the additional revenue that will be gained from choosing one course of action over the other
- Avoidable costs- costs that will not be incurred in the future if a particular decision is made
- Unavoidable costs- costs that will continue to incur no matter what the course of action.

Identifying relevant costs and benefits

Sunk costs

Worldwide Airways is thinking about replacing a three-year-old loader with a new, more efficient loader. Cross out the items which are sunk costs.

New loader	
List price	\$ 15,000
Annual operating expenses	45,000
Expected life in years	1
Old loader	
Original cost(no salvage value)	\$ 100,000
Remaining book value	25,000
Disposal value now	5,000 ^a
Annual variable expenses	80,000
Remaining life in years	

Accept or reject a special order?

- A travel agent has offered to sell a package tour from Hawaii to Japan for \$150,000.
- Worldwide Airways is considering whether to accept the offer.

Relevant Cost Analysis	
Savings in operating expenses provided by the new loader	\$ 35,000
Cost of the new loader	(15,000)
Disposal value of old loader	5,000
Net effect/benefit	\$ 25,000

Typical Flight Between Japan and Hawaii		
Revenue:		
Passenger	\$	250,000
Cargo		30,000
Total		\$ 280,000
Expenses:		
Variable expenses		90,000

Assumes excess capacity	
Special price for charter	190,000
Variable cost per flight	90,000
Reservation cost savings	
Variable cost of charter	
Contribution from charter	

Assumes no excess capacity

Special price for charter
Variable cost per flight
Reservation cost savings
Variable cost of charter
Opportunity cost:

Outsource a product or service

- A Melbourne bakery has offered to supply the in-flight desserts for 21¢ each.
- Here are Worldwide's current costs for desserts:

Variable costs:		
Direct material	\$	0.06
Direct labour		0.04
Variable overhead		0.04
Fixed costs:		
Supervisory salaries		0.04
Depreciation of equipment		0.07
Total cost per dessert	\$	0.25

If we purchase the dessert for 21¢, we will only save 15¢ so we will have a loss (or an additional cost) of 6¢ per dessert purchased.

Variable costs: additional cost) of 6¢ per dessert purchased			
Direct material	\$	0.06	\$ 0.06
Direct labor		0.04	0.04
Variable overhead		0.04	0.04
Fixed costs:			
Supervisory salaries		0.04	0.01
Equipment depreciation		0.07	-
Total cost per dessert	\$	0.25	\$ 0.15

Add or drop a product

If the digital watch line is dropped, the fixed general factory overhead and general administrative expenses will be allocated to other product lines because they are not avoidable.

The equipment used to manufacture digital watches has no resale value or alternative use.

	Keep Watch	Drop Watch	Difference
Sales	\$ 500,000		
Less variable expenses:			
Mfg. expenses	120,000		
Freight out	5,000		
Commissions	75,000		
Total variable expenses	\$ 200,000		
Contribution margin	\$ 300,000		
Less fixed expenses:			
General factory overhead	60,000		
Salary of line manager	90,000		
Depreciation	50,000		
Advertising - direct	100,000		
Rent - factory space	70,000		
General admin. expenses	30,000		
Total fixed expenses	\$ 400,000		
Net loss	\$ (100,000)		

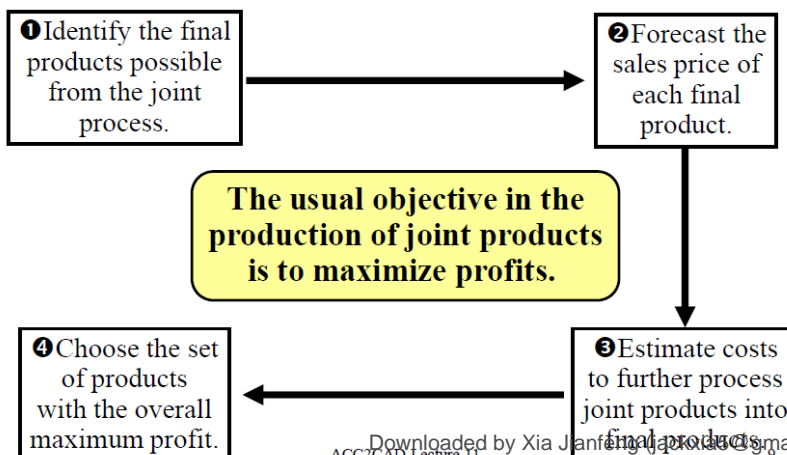
comparative income statements showing results with and without the digital watch.

Chapter nineteen- continued

Joint Products: Sell or Process Further

When a number of products are produced from a single input resulting in two or more products. The point in the production process where the joint products are identifiable as separate products is called the split-off point. For example the same production process is used to make petrol and oil

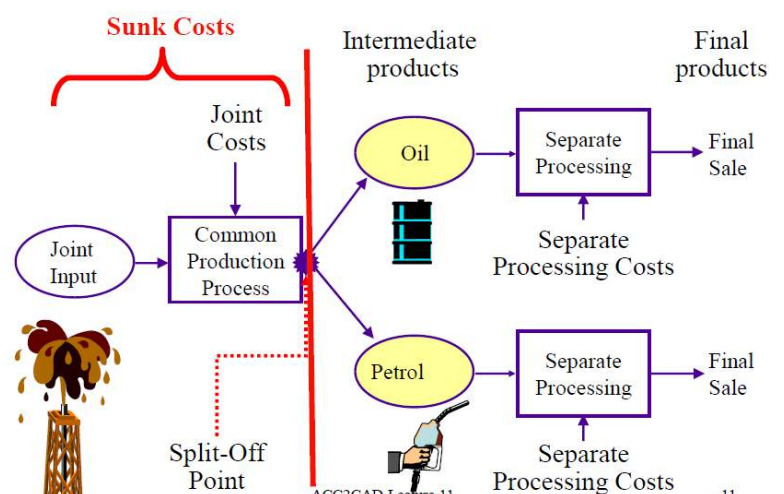
however they have a split of point to make the final product for sale.



Which joint products to produce?

Should products be processed further after split off point?

- Joint product costs incurred prior to the split-off point are sunk costs — not affected by a decision to process further after the split-off point.
- A product should be processed beyond the split-off point only if the incremental revenue exceeds the incremental processing costs.



Example: sell products at split off or process further

- Sawmill, Inc. cuts logs from which unfinished timber and wood chips are the joint products.
- Unfinished timber is sold “as is” or processed further into finished timber.
- Wood chips can also be sold “as is” for landscaping or processed further into 4 × 8 composition (MDF) boards.

Why are joint cost allocated?

Recall that Joint Costs are SUNK COSTS. They are not relevant to decisions to sell “as is” or process further decisions after split-off, so why would accountants allocate Joint Costs?

- For product costing purposes
- To calculate COGS and to value inventory.

	Per Log	
	Timber	Wood Chips
Sales value at the split-off point	\$ 140	\$ 40
Sales value after further processing	270	50
Allocated joint product costs	176	24

– If incremental profit => process further

– If incremental loss => do not process further

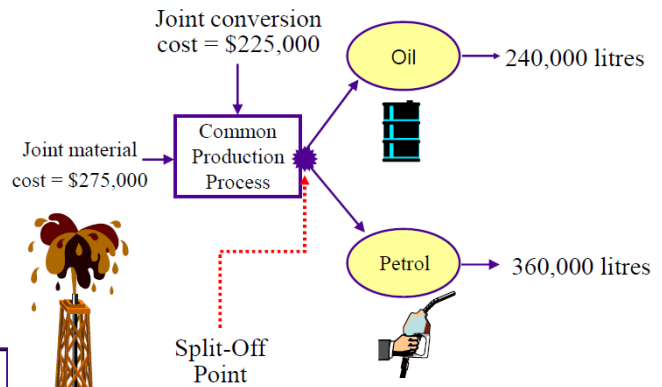
Analysis of Sell or Process Further		
	Per Log	
	Timber	Wood Chips
Sales value after further processing	\$ 270	\$ 50
Sales value at the split-off point		
Incremental revenue		
Cost of further processing		
Profit (loss) from further processing		

Joint costs can be allocated on a monetary basis (according to value) or on a physical basis (according to the volume or weight).

Example: allocation physical basis

The physical measure method may be used when

- ❶ Output product prices are highly volatile.
- ❷ Many additional processes occur between the split-off point and the first point of marketability.
- ❸ Market prices are unavailable for products such as on cost-plus contracts.



Physical Measure

- Treat each unit as equally desirable
- Assign same cost to each unit

	Product		Total
	Oil	Petrol	
Output quantities in litres Proportionate share:	240,000	360,000	600,000
Allocated joint costs:			

Example: allocation monetary basis

If products require further processing beyond the split-off point before they are marketable, it may be necessary to estimate the net realizable value (NRV) at the split-off point.

$$\text{NRV} = \text{Final Sales Value} - \text{Added Processing Costs}$$

Accounting for by-products

The net realizable value method results in equal gross margin percentages for all products.

By-products are minor products with minimal sales value compared to the major products (*Do not allocate joint costs to by-products*)

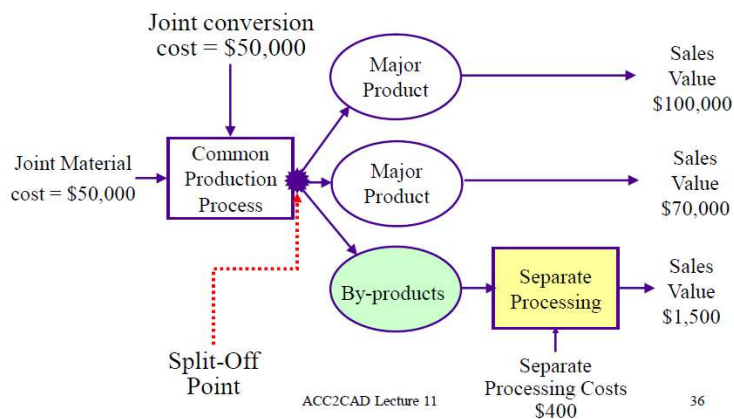
Two commonly used methods of accounting for by-products are:

- Realized Value Approach By-product NRV is treated as other revenue.
- Net Realizable Value Approach By-product NRV is deducted from joint production costs before allocation.

	Product		Total
	Oil	Petrol	
Joint cost:			
Sales value	\$ 500,000	\$ 1,200,000	\$ 1,700,000
Less additional processing costs			
Estimated NRV at split-off point			
Proportionate share:			
Allocated joint costs:			

	Product		Total
	Oil	Petrol	
Estimated NRV at split-off point	\$ 300,000	\$ 700,000	\$ 1,000,000
Less allocated joint costs	150,000	350,000	500,000
Gross margin	\$ 150,000	\$ 350,000	\$ 500,000
Gross margin as a percent of sales	50.0%	50.0%	50.0%
\$150,000 ÷ \$300,000			
\$350,000 ÷ \$700,000			
\$500,000 ÷ \$1,000,000			

Example



	By-Product Accounting Method	
	2	1
Major product revenue	\$ 170,000	\$ 170,000
Other revenue	0	1,100
Total revenue	170,000	171,100
Cost of sales:		
Joint production costs	100,000	100,000
Less by-product NRV	1,100	0
Adjusted cost of sales	98,900	100,000
Gross margin	\$ 71,100	\$ 71,100

Disposal of scrap or waste

Waste is a by-product with negative NRV. (Cost of disposal exceeds sales value). Waste is disposed of at minimum cost. Waste disposal cost is charged to manufacturing overhead and applied to other products as part of the manufacturing overhead allocation process.

Short-term Decisions Involving Limited Resources

Firms often face the problem of deciding how limited resources are going to be used. Usually, fixed costs are not affected by this decision, so management can focus on maximising total contribution margin.

- Management's goal should be to maximize contribution margin while minimizing fixed costs

Example

	Products	
	Webs	Highs
Selling price per unit	\$ 60	\$ 50
Less: variable expenses per unit	36	35
Contribution margin per unit	\$ 24	\$ 15
Current demand per week (units)	2,000	2,200
Contribution margin ratio	40%	30%
Processing time required on the lathe per unit	1.00 min.	0.50 min.

Allotting Our Scarce Resource - The Lathe

Weekly demand for Highs	2,200 units
Time required per unit	× 0.50 min.
Time required to make Highs	<u>1,100 min.</u>
Total time available	2,400 min.
Time used to make Highs	<u>1,100 min.</u>
Time available for Webs	1,300 min.
Time required per unit	÷ 1.00 min.
Production of Webs	<u>1,300 units</u>

According to the plan, we will produce 2,200 Highs and 1,300 Webs. Our contribution margin looks like this.

	Webs	Highs
Production and sales (units)	1,300	2,200
Contribution margin per unit	\$ 24	\$ 15
Total contribution margin	\$ 31,200	\$ 33,000

The total contribution margin for Martin, Inc. is \$64,200. Any other combination would result in less contribution.