

Variance Accounting

Ernest Laidler

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VARIANCE ACCOUNTING

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COSTING AND CONTROL FOR MATERIALS

Variance Accounting

Ernest Laidler, F.C.M.A.

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To Helen

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Foreword

The use of budgets and standard costs in conjunction with the process of variance analysis has been widely accepted for some time but the term 'variance accounting' is new. It was introduced in *Terminology of Management and Financial Accountancy* (published by the Institute in 1974) at the suggestion of the author, who devised the contextual structure of the management accountancy section and framed the definitions in that section of the terminology.

From his wide knowledge of industrial accounting and his teaching experience Mr Laidler has written a book which should be invaluable to managers as well as students of accountancy.

Both theoretical and practical aspects of the subject are treated in this book and the feasibility of theories is critically examined.

An understanding of the technique of variance accounting contributes to cost control for profit improvement which is vitally important especially in the current economic circumstances. This book provides a comprehensive outline of the technique and should prove of value to accountants and managers in industry concerned with profit improvement.

1976

ALEX I. G. FARQUHARSON

President

*Institute of Cost and Management
Accountants*

Preface

Towards the end of a long career in the field of industrial accounting which ranged over a wide variety of manufactures I turned to the teaching of cost and management accountancy with particular reference to Part IV of the ICMA examinations. In teaching I was deeply conscious of the difficulties experienced by students in relating academic theory to practical applications so the invitation to write this book brought with it an opportunity to attempt to bridge this gap, at least within the context of variance accounting.

The overall concept comprising the use of budgets and standard costs in connection with the process of variance analysis is widely accepted but the term 'variance accounting' is new. It is defined on page 13 of this book and the reasons for its adoption are explained in Chapter 2.

Each management accounting system, whether it incorporates the technique of variance accounting or not, must be tailored to fit a particular combination of background conditions and comply with the special requirements and preferences of the management concerned. These factors differ so widely among industrial organisations that it is perhaps true to say that each undertaking is unique. Whilst it may specialise in a particular range of commodities or services there is usually a wide variety within that range and its functional structure is likely to be complex.

To endeavour to present a system complete in every detail and devised to accommodate the myriad ramifications of an actual organisation would not best serve the readers' interests. Those who would recognise the model as closely akin to the organisations in which they

were personally engaged would represent a tiny minority and, to the rest, the intimate concern with technicalities relating to a type of manufacture in which they had no interest, and the proliferation of figurework necessitated by the product variety, would be tedious in the extreme and there would be no compensating advantages.

Many basic principles and procedures have general application but every effort has been made to explain where they vary between contrasting types of activity. Where it has been necessary to present a series of interrelated working examples these have been identified with an imaginary company – Lingrove Instruments Limited – which, happily, has but two production cost centres and manufactures only two products. This simplicity in no way invalidates the examples.

Despite the considerable diversity of background features to be found in industry, there is sufficient common ground among manufacturing undertakings to admit many valid generalisations. Service industries, on the other hand, differ so markedly from the manufacturing sector and indeed from each other that each merits individual treatment in a separate book. In this book, therefore, the emphasis is substantially on manufacture.

Definitions of cost and management accountancy terms are taken from the Institute's publication *Terminology of Management and Financial Accountancy*.

PART ONE

Measurement of Costs and Profit

INTRODUCTION

The Profit Motive in Industry

The nature of our society

Industry is an important feature of society in the highly developed parts of the world including the United Kingdom. Aided by technological advances it aims at progressive improvements in living standards through mass production. Basically, human effort is applied to –

- (a) the procurement and cultivation of natural resources through mining, agriculture, etc.,
- (b) the conversion of natural resources into commodities which directly or indirectly give greater consumer satisfaction,
- (c) the effective distribution of natural resources and commodities, and
- (d) the provision of services such as security, communications, entertainments, etc.

Capital

A progressive society produces more wealth than it consumes and there accumulates an ever-increasing mass of equipment and facilities (i.e. capital) which augment human effort in the production of further wealth. The owners of such capital make it available to projects carrying varying potentialities of success or failure. Many projects prosper but, unfortunately, some do not, in which case the applied savings are lost.

Prices

The exchange values of commodities and services are expressed in terms of money and, ideally, added values resulting from applications of

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human effort, capital and enterprise should provide fair rewards to all concerned. Tragically, however, the distribution of wealth has long been and continues to be a field of conflict which, in itself, seriously restricts the further creation of wealth.

Ownership and profit

Industry in the United Kingdom is owned partly privately and partly by the State. Private enterprises must earn profit in order to survive. Whilst the same does not necessarily apply to nationalised industries, their performances are measured in terms of profit or loss and the national interest is much better served by profit than by losses. Industrial managers must therefore strive to maximise profit in relation to employed capital.

Information for management

Modern industries are complex and managers require a considerable amount of information concerning the activities for which they are responsible. As to the nature of individual organisations there is considerable diversity within each industrial category, in fact it is reasonable to regard each enterprise as unique. Each accounting system must be tailored closely to accord with both the domestic environment and the personal preferences of management concerning the form and use of information to facilitate control. The possibility of adopting a complete system from a textbook is most remote.

Management accounting

The needs of management, as outlined above, are served by management accounting which may be defined as

the application of professional knowledge and skill in the preparation and presentation of accounting information in such a way as to assist management in the formulation of policies and in the planning and control of the operations of the undertaking.

In this book different management accounting methods, principles and techniques are considered, particular attention being given to the technique of variance accounting.

CHAPTER 1

Methods, Principles and Techniques

1. COST AND PROFIT STRUCTURE

Costs

Figure 1 illustrates (i) the elements of cost, (ii) the functional classification of costs, and (iii) the analysis of total cost. These costs are the monetary representations of resources used and are all relative to the main objectives of the business, e.g. the manufacture and sale of products.

Direct and indirect production costs

Direct production costs are those items of production cost which can be identified with and charged to a specific product. In the manufacture of furniture, the wood, upholstery and other materials embodied in the product are direct materials, whilst the remuneration of the craftsmen working on the product are direct wages. Costs which are too general to be identified with specific products are regarded as indirect. The term 'overhead' is applied to the sum of indirect materials, indirect wages and indirect expenses.

Fixed and variable costs distinguished

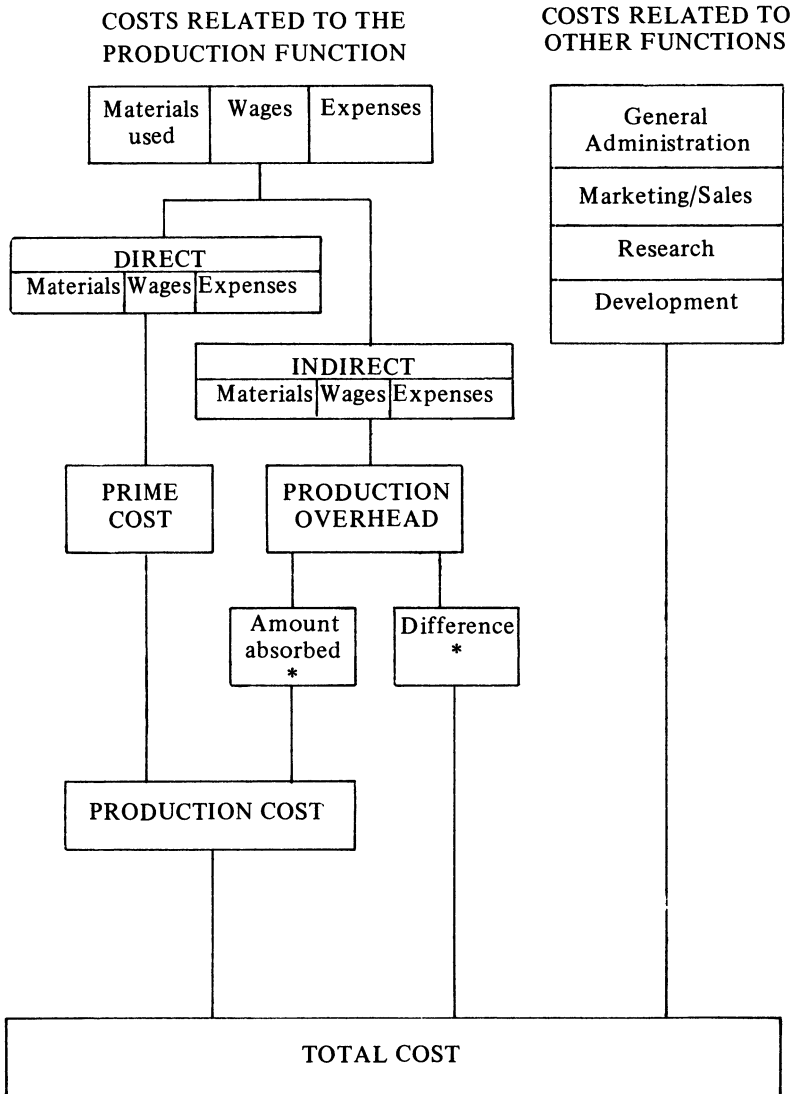
The distinction between fixed and variable costs relates to the way in which a particular item of cost reacts to change in the volume of production or sales. Consider the question – if it costs £30,000 to make 6000 uniform articles per week what would it cost to make 7000 per week under identical conditions? A person having no experience of

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FIGURE 1 – The Elements of Cost (in relation to a typical manufacturing organisation)

This illustrates (i) the elements of cost, (ii) the functional classification of costs and (iii) the analysis of total cost.

*In the case of marginal costing the amount of production overhead absorbed relates to the variable category only.



factory costs would probably give an incorrect answer of £35,000. The correct figure must obviously be less than £35,000 because the stated cost of £30,000 must include, not only direct materials and wages, but appropriate portions of such costs as rent, rates, insurance and executive salaries which would not cost more in consequence of production being stepped up to a limited extent. The correct answer cannot of course be calculated unless the cost of £30,000 is broken down into its fixed and variable elements.

Fixed costs

These accrue in relation to the passage of time and, within certain output or turnover limits, tend to be unaffected by fluctuations in volume of output or turnover. Drastic changes in output or turnover levels can bring about changes in such costs, and so long as this is recognised it is safe to classify costs as fixed or variable in relation to the anticipated range of output or turnover.

Variable costs.

These, in the aggregate, tend to vary in direct proportion to changes in the volume of output or turnover (*output* in the case of production costs and *turnover* in the case of marketing costs). Direct wages are usually classified as variable – but see ‘Direct wages – fixed or variable?’, page 42. In factory conditions few items of indirect cost, or overhead, are purely variable, consumable tools and supplies may be so classified. Salesmen’s commission is usually regarded as variable marketing (or selling) cost.

Semi-variable costs

These contain both fixed and variable elements and are therefore *partly* affected by fluctuations in the volume of output or turnover. Examples are general labourers’ wages and repairs and maintenance.

Apportionment of semi-variable costs

Approximation. Budgeted semi-variable overhead is apportioned into fixed and variable categories so that the semi-variable category disappears and only the fixed and variable categories remain. This split is one concerning which few accountants in industry are complacent because *it cannot be effected with precision*, despite the availability of certain theoretical devices. Superficially, such devices hold promise of scientific means of effecting precise measurement but this impression is illusory.

Unfortunately for students, what might have been a simple part of

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the overall subject of management accounting has become clouded with unnecessary contradiction and confusion by the propagation of theories based on the mistaken notion that such costs as welfare expenditure, supervision, heating and lighting should be controlled to rise or fall in harmony with fluctuations in the number of direct labour hours worked. *One of the most effective ways in which an accountant in industry could destroy mutual confidence between himself and a production executive would be to suggest such a concept to the latter.* How was such theory born? A possible answer is that where products are not homogeneous and thus lack a common measure such as kilogram, metre or litre, it is often expedient to resort to a common denominator such as *direct labour hours* in order to load variable overhead on to products. *This is, however, merely a means to an end.* There are no grounds for trusting that the influence of labour hours on variable overhead is more precisely measurable than that of production volume. Once the cost is related to the unit of product it remains so related. To assume otherwise is to court confusion because a firmly established convention is that total contribution is *unit contribution multiplied by numbers of units sold* and variable overhead *per unit* is a component of unit contribution. The convention stated in the *ICMA Terminology* (1974), which relates variable overhead to product quantity, like all conventions is not entirely true, but it is as near to the truth as possible and it has the merit that it harmonises with other conventions which are generally accepted. Accounting systems measure costs *approximately* and some elements can be measured more accurately than others. The accountant must be able to make distinctions otherwise he will delude himself and mislead those whom he is employed to serve. Polonius could well have had management accountancy in mind when he advised – ‘This above all – to thine own self be true, And it must follow, as the night the day, Thou canst not then be false to any man.’

That variable overhead cannot be determined accurately is not serious because the variable portion of total overhead is usually comparatively small. Moreover, reasonable approximation is an acceptable and necessary convention in cost and management accounting.

The scattergraph. The vertical axis of the graph represents cost whilst the horizontal axis represents production or sales volume. Each point plotted represents the cost incurred, and the production or sales volume achieved in a particular cost centre in one of the selected past months. It is usual to plot the historical results of the last twelve months. When all points have been plotted the next task, *which is more*

easily described than accomplished, is to draw a sloping 'line of best fit' through the cluster in such a way that the aggregate of the distances between the upper points and the line is equal to the distances below the line. The line is projected until it meets the vertical axis and this is supposed to indicate the average monthly fixed cost. Examples are sometimes presented in which the hypothetical plottings are so conveniently positioned that there is little difficulty in drawing the line of best fit, but such convenience is seldom found in practice. Usually, volume fluctuations are not severe and there is a tendency for the figures to be such that, if plotted on a scattergraph, they would be clustered within a narrow vertical band comparatively distant from the vertical axis, so that the slope of the line would be purely a matter of guesswork. When this 'hit or miss' feature of the scattergraph is linked with the dubious nature of the historical data (*dubious* because costs are influenced by numerous factors other than volume fluctuations) and taking into account the time consuming task of plotting the points, it is difficult to support its use for this particular purpose.

'Least squares' method. This method is often associated with the scattergraph although the approach is completely different and the graphical presentation of the results is optional. Whilst it avoids the 'hit or miss' drawing of the line of best fit, it relies on the same suspect basic data and is also time consuming. In view of these considerations it is difficult to justify its application in practical situations. The method is fully described in most books on business mathematics.

Personal judgement. The most satisfactory course of action is to rely on the experience and personal judgement of the executive responsible for the expenditure. For example, the manager of the assembly shop may agree that his present squad of five labourers would remain constant within a specified span of production levels. He may further indicate the levels at which he could operate with one less or one more. If necessary, his decision would be confirmed or amended by the production manager.

Profit and loss

In the operation of the costing system some of the cost is related to unsold stocks and work in progress on hand at the end of the accounting period. The difference between that part of the cost which is related to goods *sold* and the net proceeds of sales is the *operating profit (or loss)*. Operating profit may therefore be defined as the profit arising from the

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normal activities of the business, such as the provision and sale of manufactured goods and services, before taking account of extraneous transactions such as those of a purely financial nature.

To the operating profit is added any revenues of a purely financial nature such as interest and dividends from investments in other companies and there would be deducted any outgoings extraneous to the main purposes of the enterprise such as interest on debentures and other loans and donations to charities. The remaining figure would be *net profit* (before tax).

Contribution

- (a) *per unit*. This is the difference between the selling price of a unit of product or service and its variable cost.
- (b) *in total*. This is the difference between the sales value and the variable cost of such sales.

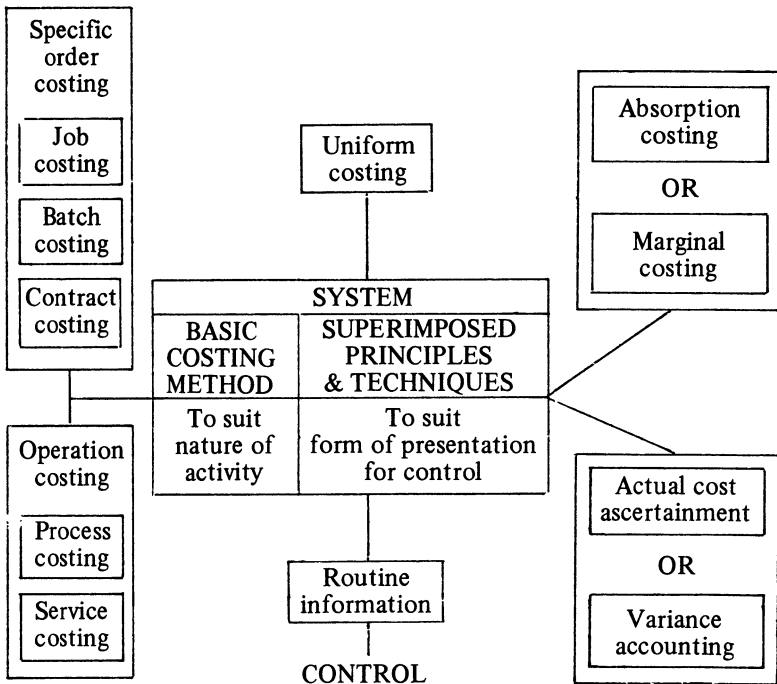


FIGURE 2 – Methods, Principles and Techniques of Management Accounting Systems. This figure illustrates how one of the alternative basic costing methods combines with one or more superimposed principles and/or techniques to form a complete routine system.

2. BASIC COSTING METHODS

Definition

Figure 2 (page 10) illustrates the components of management accounting systems and shows how a basic costing method combines with certain superimposed principles and techniques to form a complete routine system. The principles and techniques are considered later (see page 12). The basic costing methods are devised to suit the methods by which goods are manufactured or services are provided. They may be broadly classified under –

- (i) Specific order costing, or
- (ii) Operation costing.

Specific order costing

This is the category of basic costing methods applicable where the work consists of separate contracts, jobs or batches, each of which is authorised by a specific order or contract, specifications being laid down by the customers.

(a) *Job costing* applies where work is undertaken to customers' special requirements. As distinct from contract costing, each job is of comparatively short duration. The work is usually carried out within a factory or workshop where each job moves through the processes or operations as a continuously identifiable unit, although the term may also be applied to such work as property repairs carried out on the customers' premises. The method may also be used in the costing of internal capital expenditure jobs.

(b) *Batch costing* applies where similar articles are manufactured in batches either for sale or for use within the undertaking. In most cases the costing is similar to job costing.

(c) *Contract costing* applies where work is undertaken to customers' special requirements and each order is of long duration (compared with those to which job costing applies). The work is usually of a constructional nature. In general the method is similar to job costing although it has certain distinctive features.

Operation costing

This is the category of basic costing methods applicable where *standardised* goods or services result from a sequence of repetitive and more or less continuous operations or processes to which costs are charged

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before being averaged over the units produced during the period. Specifications are laid down by the manufacturer or provider of the service. Sub-categories are

(a) *Process costing*, which applies where standardised goods are produced.

(b) *Service costing*, which applies where standardised *services* are provided either by an undertaking or by a service cost centre within an undertaking. The method may be used where the service is not completely standardised but where it is convenient to regard it as such, and to calculate average costs per period in relation to the standardised unit of measurement, e.g. *passenger-mile* in the case of public transport.

3. SUPERIMPOSED PRINCIPLES AND TECHNIQUES (see Figure 2, page 10)

Definition

These are principles and techniques devised to suit the form in which it is decided to present information to management. For example, a managing director may insist on the actual costs of all products being calculated each period or, alternatively, he may be prepared to forgo actual costs and to rely on information as to how much profit has been gained or lost for this or that reason. Again, he may prefer that costs of products and valuations of stocks should be inclusive of appropriate shares of all overhead expenditure related to the production function or, alternatively, he may prefer that such figures should represent variable cost only. These alternatives are examined in this book.

Absorption costing

This is a principle whereby fixed as well as variable costs are allotted to cost units. The term may be applied where (a) production costs only, or (b) costs of all functions, are so allotted. In no event, however, would marketing costs be included in inventory valuations. Absorption costing is the alternative to marginal costing.

Marginal costing

This is a principle applied to routine systems whereby marginal costs of cost units are ascertained. Only variable costs are charged to cost units, the fixed costs attributable to a relevant period being written off in full against the contribution for that period. It is the alternative to absorption costing.

Marginal cost is the variable cost of one unit of product or service, i.e. a cost which would be avoided if the unit was not produced or provided.

Actual cost ascertainment

This is a principle whereby the costs of cost centres and cost units are ascertained which, subject to certain approximations, are deemed to represent actual costs. It is the alternative to variance accounting.

Variance accounting

This is a technique whereby the planned activities of an undertaking are expressed in budgets, standard costs, standard selling prices and standard profit margins, and the differences between these and the comparable actual results are accounted for. Management is periodically presented with an analysis of differences by causes and responsibility centres, such analysis usually commencing with the operating profit variance. The technique also includes the establishment of a suitable arrangement of accounts in the principal ledger – either the general ledger or the cost ledger. The technique is the alternative to actual cost ascertainment *and is the subject with which this book is mainly concerned.*

Uniform costing

This is the use by several undertakings of the same costing system, i.e. the same basic costing method and superimposed principles and techniques. It applies to groups of organisations such as –

- (a) member firms of trade organisations,
- (b) industrial organisations – which may be single companies, groups of companies or nationalised industries – whose activities are carried out at two or more separate locations.

CHAPTER 2

Evolution of Variance Accounting

1. ACTUAL COST ASCERTAINMENT (see page 13 for definition)

The earliest costing systems were devised with the main objective of ascertaining the costs of products. In job order situations managers wanted assurance that work was not being undertaken unprofitably, either because of faulty estimating techniques or inefficiency in carrying out the work. Where standardised products were made for stock the most effective way of maximising profit was seen to be by keeping a close watch on the product costs in successive costing periods, investigating the causes of significant fluctuations and taking any remedial action called for. At the same time profit margins were kept under review and action was taken either to discontinue unprofitable lines or to make them more profitable by reducing costs or, if feasible, increasing prices.

This concept is still widely applied although there is a gradual movement towards the alternative concept of variance accounting, particularly in the mass-production field. Most mass-production situations are complex, featuring wide product ranges and numerous stages of manufacture. Where such organisations continue to apply the actual cost ascertainment concept, the mechanics of analysing periodical cost fluctuations can be extremely laborious and often unrewarding. The picture is often blurred by the way in which cost fluctuations arising in a certain period find their way into the following period through their influence on valuations of work in progress and finished stocks. Moreover, the differences revealed by the exercise often give misleading impressions,

e.g. if the labour cost of a process was 40 pence per unit in April compared with 45 pence in March, this may be regarded as a favourable result; but the truth may be that, given reasonably efficient performance, the cost should not exceed 35 pence per unit.

2. STANDARD COSTING

Towards the end of the nineteenth century a movement towards scientific management developed in the United States of America. This sought to determine the most efficient production methods and to standardise them. It was not long before scientifically minded managers wanted to know, not only what operations had actually cost, but what they *should have* cost when performed efficiently under suitable conditions. Thus was born the concept which became known as 'standard costing'. The adoption of this technique progressed very slowly in the United States and even more slowly in the United Kingdom. The first comprehensive work on the subject was published in 1930 (G. Charter Harrison, *Standard Costs*).

3. BUDGETARY CONTROL

The idea of controlling business operations through the use of budgets was born in the early years of this century and the technique is now substantially used by commercial and industrial organisations.

4. THE UNIFIED TECHNIQUE

Historically, the terms 'budgetary control' and 'standard costing' have referred to two distinct techniques although in most of the industrial field the role of each became complementary to the other. By process of evolution, they were inevitably drawn together and merged into a single technique. Nowadays variance statements presented to top management usually commence with the operating profit variance (or sometimes the net profit variance), the analysis of which then proceeds, stage by stage, through all sections of the revenue and cost structure. The different variances are not necessarily ascertained in the same sequence as that in which they are presented. For example, it is convenient to determine the material price variance and many others before the profit figure.

Where charging rates for overhead are required for purposes of standard product costs, these are derived from the budget, whereas the amounts to be included in the budget for prime costs are related to the standard costs. The budget and the standard costs both play their part

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in the process of variance analysis, and a management accountant preparing a statement of variances would regard as pointless any attempt to segregate his figures into two distinct theoretical sectors. He is dealing with *all* variances which have affected the operating (or net) profit.

The author's suggestion that the unified technique be termed 'variance accounting' was adopted by the Institute of Cost and Management Accountants, and in the Institute's 1974 *Terminology* 'budgetary control' and 'standard costing' respectively are defined within the context of variance accounting.

5. BUDGETARY CONTROL IN ISOLATION

There are many situations in commerce and industry where it is not feasible to use standard costs within a system of variance accounting. The work performed may not be sufficiently standardised or repetitive, or the enterprise is purely commercial. In such cases control through budgetary procedure is not only feasible but highly desirable.

6. JOB ORDER INDUSTRIES

In such industries work is undertaken to customers' special requirements. A usual preliminary is for a cost estimate to be prepared, which provides the basis for the quotation. An order may or may not result. Examples are printing, manufacture of metal castings, property repairs, constructional engineering and haulage.

Whilst, fundamentally, each job is unique, there are often elemental operations common to a wide range of jobs for which standard costs may be worked out. The estimator will make full use of these but there is an over-riding necessity for him to exercise his expertise in estimating costs of non-standard elements of the job and in assembling the complete estimate, which becomes, in effect, a standard cost for the particular job, against which the eventual *actual* cost is compared. This direct comparison between estimated and actual cost is appropriate to the particular circumstances and can be effective as a control procedure, particularly if the estimate is prepared with due regard to the efficient utilisation of materials, employees' time and equipment. Excessive costs are investigated and, whilst losses already incurred cannot be recouped, disclosure of the causes leads to measures being taken to prevent recurrences in future operations.

The foregoing procedure should not, however, be regarded as part of the concept of variance accounting as applied to mass-production industries. In job costing the *actual* cost of each job is ascertained, work in

progress is valued at *actual* cost and *actual* costs of completed jobs are carried to the profit and loss account. Nevertheless the application of budgetary control is both feasible and desirable in this type of business.

7. MASS-PRODUCTION INDUSTRIES

Where standardised goods are produced it is both feasible and desirable to apply a complete system of variance accounting in which budgets and standard unit costs are employed. The technique is examined in detail in subsequent chapters but the ways in which this kind of system differs fundamentally from that referred to in the previous paragraph are now detailed.

- (i) Costs are entered against operations, processes and products as in actual product costing but, at each stage, where necessary, actuals are converted to standard by clerical adjustment. For examples see Statement 6 (page 88). £50 is debited to product HT because the actual direct wages cost is lower than standard by this amount owing to efficient work, whilst £190 is credited because the process loss is excessive. In such a case £50 would be credited and £190 debited to a variance account. Note that transfers of product to a succeeding process are effected at standard cost;
- (ii) work in progress and stocks of finished goods are valued at *standard* cost;
- (iii) actual costs of finished products are not usually ascertained (see page 90, method 3). If reference is made to the cost of product Y, the only available cost is the standard cost, which could well be regarded as an advantage rather than a disadvantage. Actual costs usually tend to fluctuate for many reasons and freak results sometimes arise, so actual costs do not provide a suitable basis for the formulation of policy decisions. A standard cost is much more reliable as it is prepared from scientifically measured data in relation to a prescribed set of working conditions and with acceptable allowances for lapses from perfection.

8. BRIEF OUTLINE OF CONTROL THROUGH VARIANCE ACCOUNTING

- (i) management defines both long and short-term objectives of the organisation, making due allowances for all foreseeable future external influences;
- (ii) long- and short-term plans, aimed at fulfilling the defined

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- objectives are formulated, and set out in the form of budgets;
- (iii) the annual set of budgets is prepared in detail. These lay down standards of performance, not only for major functions and departments, but also for manufacturing processes and operations. All such standards are related to specific responsible executives. The master (or summary) budget shows the target profit;
 - (iv) all deviations from standard performance which affect the profit are ascertained and reported to management who take appropriate action.

9. INFORMATION FOR MANAGEMENT – THE EXCEPTION PRINCIPLE

Planned objectives

The future activities of an organisation must be carefully and realistically planned and expressed in budgets and standard costs. The budgets cover the broad aspects of the business such as sales, the costs of the production, marketing and general administration functions and capital expenditure, whilst the standard costs relate to the detailed manufacturing operations. The budgeted figures are *aggregates* whilst the standard costs are expressed in *unitary* terms. At the apex of the plan is the target profit.

Implementation

Having formulated the plans, management must assume responsibility for their implementation. This requires frequent, timely and useful information, and in particular, any significant deviations from the plans must be reported as soon as possible after they arise.

Reporting deviations

Orthodox manufacturing, trading and profit and loss accounts, as illustrated by Statement 9 (page 105) show the revenue from sales, the items of cost attributable to those sales and the profit. Variance accounting is essentially a technique in which *exceptions* are reported, as exemplified by Statement 8 (page 97). Notice how the variances form a bridge between the budgeted and actual profit.

Managerial levels

In a large organisation having many departments and a wide product range, the variances from standard in a specific period are numerous.

Variance statements presented to senior management are broader in scope and less detailed than those provided to lower levels of management. For an example of a departmental operating statement see statement 7 (page 95), which is restricted to matters with which the departmental manager is personally concerned. The department is a *responsibility centre* and a budget must be prepared or approved by the executive in charge. It is important that all variances are reported to him with the minimum delay. The same variances are included with those of other budget centres in a summarised statement submitted to the official next higher in seniority, for example the production manager.

Interim quantitative reporting

A reported loss is usually a *fait accompli* but it is assumed that, by promptly revealing that something has gone wrong, timely action will be taken to remedy the fault. Having installed a system whereby variances are reported in monetary terms at monthly or four-weekly intervals, the question must be asked – is this the best that can be done? In the processing of an expensive material suppose that a fault develops in the first week of April and the process loss, which should not normally exceed five per cent, rises to ten per cent. If this fault remains unsuspected until it is revealed by a variance statement in May, its duration could be five or six weeks and could cost the company many thousands of pounds. Is this the best that can be devised in the way of a control system?

In such circumstances there is a need for more effective reporting. Within a day or two of the fault commencing the process supervisor should be warned. To compile *monetary* accounts more frequently than monthly or four-weekly would be too expensive. However, this problem is solved in many cases by a procedure of quantitative recording and reporting.

Production quantities may be divided into conveniently sized batches – say one to five batches per week, each batch being covered by a separate, consecutively numbered, manufacturing order or waybill which in effect accompanies the work from process to process. Input and output quantities are carefully measured and recorded on the document, together with any added materials or extractions of scrap or waste. At the completion of each clearly defined processing stage the document is passed to a clerical centre, either the cost office or an offshoot, so that significant ratios can be calculated and recorded, e.g. scrap, process loss and yield, after which the document is returned to

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the appropriate supervisor for his information and for further recording of production data. In addition, weekly statements of production ratios may be prepared and circulated to the executives concerned. Other quantitative data may be recorded and reported in a daily or weekly cycle, e.g. personnel items such as direct hours per unit, idle time, overtime, absentees, and mechanical data such as machine running hours, idle machine time, etc.

The arrangement of process work *in batches* as described above should not be confused with *batch costing* as no attempt is made to apply monetary values to each batch. The recorded quantities are summarised monthly or four-weekly and are incorporated in the cost accounts.

PART TWO

Setting Targets

CHAPTER 3

Long- and Short-Term Planning

1. ENTERPRISE POLICY – LONG-TERM PLANNING

Planning horizon

Because of present turbulent economic conditions it behoves those who control commercial or industrial enterprises to consider the future and to try to foresee likely changes in the business environment. Will it be possible for the business to expand or, at least, to maintain its present position? What difficulties are likely to arise, and when? How can they be forestalled or surmounted? As the eyes of the marine navigator scan the prospect as far as the distant horizon, so must the business planner look to his 'horizon', which is the time span within which events relevant to him can reasonably be foreseen.

Long-range objectives

They must be clearly defined. In these, target profits will feature prominently.

Planned strategy

A strategy must be worked out to accomplish the objectives. This may envisage the development of new products or the taking over of companies producing similar or even quite different products. It may be necessary to open new factories or distributive branches or invest in new equipment.

Long-term plan

If, for example, the planning time span is five years, a five-year plan is worked out, allowances being made for inflationary trends. On being adopted it may be termed the 'basic budget', which is kept up to date by periodic revision, say annually. It is then maintained constantly as a five-year budget. Though much broader in scope and less detailed than a 'current' budget it is used as a basis for developing current budgets.

2. CURRENT BUDGETS

Current budget

This is established for use over a short period, usually one year, but sometimes less, and is related to current conditions. 'Current conditions' may be interpreted as the average conditions likely to prevail during the budget period. As the current budget is developed from the 'basic budget' it will be consistent with the long-term policy of the company. (In this context 'budget' refers to the complete set of budgets for a specific period.)

Responsibility

Although the management accountant as such is closely concerned with the preparation of budgets, particularly in the conversion of quantities to money values, and is also responsible for reporting results to management, the planning, co-ordination of activities and control *are the responsibilities of management*. By delegation, responsibility for functional and departmental activities falls to the executives concerned.

Budget centres

These are sections of an organisation defined for the purposes of budgetary control. A cost centre is a location, person or item of equipment (or group of these), in respect of which costs may be ascertained and related to cost units.

It is possible for the division of an organisation into *budget centres* to be the same as the division into *cost centres* although exceptionally, a group of cost centres controlled by the same supervisor may constitute a budget centre. Budgetary control relates the responsibilities of executives to established policy. A clear cut *organisation structure* is essential and there should be no doubt as to the identity of the executive in whom responsibility for a budget centre is vested; an established organisation chart is essential. The executive either prepares his own budget or is consulted in its preparation, and the budget plan must be acceptable by him as reasonably capable of being fulfilled. This condi-

tion having been satisfied he is personally motivated towards exercising effective control over the activities for which he is responsible, with a view to achieving results which compare as favourably as possible with the accepted standards.

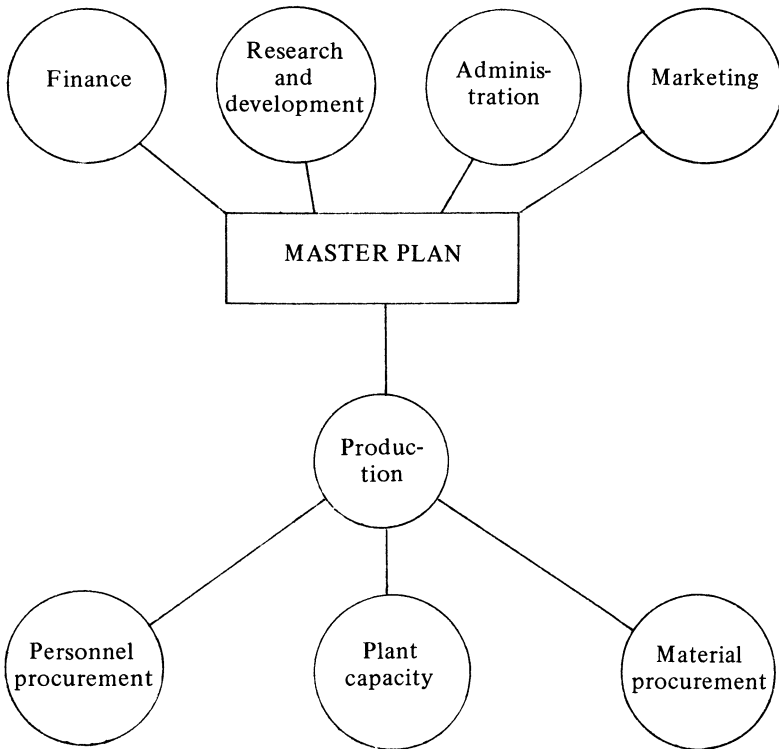


FIGURE 3 – Co-ordination of Functions

All functions must be co-ordinated and geared to the overall objective.

Co-ordination

The numerous segments of a typical organisation resemble the components of an intricate mechanism. Each must be shaped and geared and, if necessary, adjusted to conduce to the operating perfection envisaged by the designer; co-ordination is the key. Consider the consequences of a record-breaking output achieved by an over-enthusiastic production manager when adverse market conditions seriously restricted sales. Of course this does not happen in a well-run organisation as all functions are co-ordinated and geared to the common objective.

Administration of budgetary procedure

The ultimate responsibility for adopting a profit plan and for its implementation is vested in the chief executive (usually the managing director) though most of the detailed work is delegated to a committee. The bringing together of the main functional heads of the business conduces to the co-ordination of those functions in the pursuit of the common objective. The managing director usually acts as chairman to the committee and makes the final decision relative to any controversy among functional heads or other matters of major importance. The terms of reference of the budget committee may be either –

- (i) restricted to the preparation and finalisation of a full set of budgets acceptable to the managing director, or
- (ii) extended to include consideration of periodical performance reports throughout the year and the formulation of recommendations arising therefrom, in which case it assumes the role of a management advisory committee, although its name would probably not be changed.

The chief duties of the budget committee are usually –

- (i) to formulate and maintain suitable procedures for the preparation, revision and approval of budgets and for the subsequent exercise of control,
- (ii) to specify dates for the presentation of each part of the budgeting work and of performance reports,
- (iii) to receive individual budgets and to consider them in relation to established objectives, each other, and recognised limiting factors,
- (iv) to suggest revisions where necessary and to receive and consider revised budgets,
- (v) to recommend approval of budgets when they constitute a fully co-ordinated and acceptable set of plans,
- (vi) to receive and consider performance reports,
- (vii) to recommend remedial action as necessary.

The administrative work is undertaken by an executive designated ‘budget secretary’, ‘budget officer’ or ‘administrative officer’. Usually this responsibility is accepted by the management accountant whose main duties are –

- (i) to act as secretary to the budget committee and to provide the necessary liaison between the committee and the executives (other than committee members) who are concerned in the budgetary procedures,
- (ii) to control the accounting procedures and to prepare and submit

- budgeted profit and loss statements and balance sheets to the budget committee,
- (iii) to prepare and submit performance reports to the budget committee and to the heads of budget centres,
 - (iv) to advise the committee as to the financial effects of plans under consideration,
 - (v) to supervise the preparation of the budget manual,
 - (vi) to design forms relevant to the procedures,
 - (vii) to maintain constant contact with executives during the budget preparation stages, and generally contribute to the prompt completion of each item in accordance with the official timetable.
- The budget officer is essentially acting in an advisory and co-ordinative capacity and has no line authority except over his own staff.

Budget manual

The manual regularises the budgetary procedures. The contents vary according to the needs of individual companies, but the following items are usually included –

- (i) *Purposes of budgetary procedure.* A statement of the purposes for which the system is devised, with emphasis on the importance of the co-ordination of all sections of the organisation in the common plan.
- (ii) *Organisation chart.* The company's organisation structure clearly showing lines of authority and responsibility. Symbols indicate which departments or sections are designated budget centres. Executives such as the sales and production managers, who are members of the budget committee, are shown in relation to their normal individual functions. The budget committee, being an advisory body, would not appear within the lines of authority.
- (iii) *Budget committee.* A note on the constitution of the committee and its functions.
- (iv) *Budget officer.* A note on his responsibilities and functions.
- (v) *Control periods.* Details of the division of the budget year into months or other control periods.
- (vi) *Principles and procedures.* A set of rules governing the preparation, form and contents of budgets and performance reports.
- (vii) *Timetable.* A schedule of dates for the presentation of each part of the budget and of performance reports.

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- (viii) *Distribution schedule.* Instructions as to the number of copies of each document to be provided and their distribution.
- (ix) *Action.* Directives for taking remedial action, and by whom. Instructions would not emanate from the budget committee or from the budget officer (except to his own staff) but would follow the lines of authority laid down in the organisation chart.

Budget control periods

These are short periods in respect of which comparisons are made between budgeted and actual results. They are usually the same as the costing periods in respect of which costs are ascertained. The most usual subdivisions of the year into 'costing' or 'control' periods are —

- (a) twelve calendar months,
- (b) thirteen four-weekly periods.

(a) *Calendar months.* This basis is preferred by many companies because —

- (i) it coincides with commercial practice for the grouping of transactions and the settlement of accounts,
- (ii) closer integration or interlocking of financial and cost accounts is facilitated,
- (iii) staff salaries are so related,
- (iv) it encompasses the whole 365 (or 366) days of the year.

Its adoption has the disadvantage that wages usually relate to the week ending on a Friday, Saturday or Sunday night, so that whenever the month ends on some other night it is then necessary to split a week's wages into two separate amounts, both for total and for each item in the analysis, an exercise which needs much clerical time.

(b) *Thirteen four-weekly periods.* The advantages of this basis are

- (i) the inconvenience of split payrolls is avoided,
- (ii) subject to certain exceptions due to bank holidays, etc., it equalises the control periods and budgeted annual expenses may be evenly apportioned. Budgeted production and sales figures may also be equally apportioned provided these activities are planned to proceed constantly through the year.

Difficulties are

- (i) the thirteen periods comprise 364 days, leaving one, or sometimes two, days excluded. (Some companies allow these extra days to accumulate and an extra week is added each five or six years),
- (ii) the budget year does not coincide with the financial year,

- (iii) control periods do not coincide with the periods to which certain costs relate; for example monthly salaries,
- (iv) the purpose of having control periods of equal duration is often frustrated because periods are shortened by national holidays and by industrial disputes.

Limiting factor (also known as the 'key' or 'principal budget' factor).

This is the factor which, at a particular time, or over a period, will limit the activities of an undertaking. The limiting factor is usually the level of demand for the products or services supplied by the undertaking, but it could be a shortage of one of the productive resources, e.g. skilled labour, raw material, machine capacity or liquid funds. In order to ensure that the functional budgets are reasonably capable of fulfilment, the extent of the influence of this factor must be assessed. Obviously there is *always* a limiting factor otherwise expansion could extend to infinity.

If, either fortuitously or because deliberate measures have been taken, a factor ceases to be restrictive, it is immediately replaced by another. It is not sufficient merely to arrange for the plans to provide for the full utilisation of the limited resource, it must be allotted to work which promises the highest contribution per unit of that factor, otherwise the maximum profit will not be realised. A situation where a shortage of raw material is vital in setting budgets is described under 'adequacy of available resources' on page 35.

Planning for budget preparation

The essential co-ordination of functions is referred to on page 25. In an organisation where standard product costs are a feature of the control system, a close interrelationship must exist between the production budget and the standard product costs. Apart from the fact that priorities differ from company to company, it would be misleading to present, by way of example, a list of budgets and standard costs with the implication that it indicated a definite work-flow sequence. A vast amount of detailed work on different budgets and on standard costs proceeds simultaneously. The first budget to be presented is usually for provisional sales, sales being the most common limiting factor. *In theory*, where the limiting factor is other than sales, the first budget should relate to the function containing the limiting factor, but it is often found more convenient in practice to start with a provisional sales budget in any case and to adjust it if necessary during the process of correlation with the production budget.

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If the work is not carefully planned and promptly executed, the process may be unduly protracted. The distinct stages of budget and standard cost preparation are scheduled against a time scale thus providing a basis for progress control; thus the smooth and expeditious progress of the work is ensured. A likely future development could be the more widespread use by progressive organisations of the network analysis technique from which the *critical path* is determined. The preparation of the different budgets is described in the chapters which follow.

CHAPTER 4

Functional Budgets

1. SALES BUDGET

Initial sales forecast

A sales forecast usually precedes the preparation of the sales budget, and is a prediction in the light of circumstances expected to prevail. It differs from a budget in that it does not take account of special action which may be taken by management to influence the course of events. All reasonable sources of information concerning the potential market for the company's products or services are used. These include –

- (i) actual sales during a recent completed period with particular attention to significant trends,
- (ii) information from area managers and representatives concerning recent or future changes in local conditions, the impact of competition, etc,
- (iii) market research reports (home and export),
- (iv) announcements of government legislation, e.g. changes in VAT or hire-purchase regulations,
- (v) economic surveys, e.g. future prospects as to the level of employment, the availability of funds and business conditions generally.

A sales forecast is synthetic, being built up from details classified in the following ways –

- (i) sub-centres of responsibility, e.g. sales territories and individual salesmen,
- (ii) products or product groups,

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- (iii) nature of outlet, e.g. wholesalers, supermarkets, other retailers, government departments, export,
- (iv) control periods.

It is often found that a greater sales volume than that represented by the initial forecast is desired, in which case ways and means of improving on the forecast are sought. The following possibilities may be examined –

- (i) increased expenditure on advertising and other sales-promotion schemes,
- (ii) expansion of the sales organisation,
- (iii) introduction of new products,
- (iv) improvement of product designs and packaging,
- (v) reduction of prices to combat competition.

One or more of the foregoing measures may be adopted but they must not conflict with the guide lines laid down by the established enterprise policy and they must be economically sound. It would be foolish to spend a further £100,000 on advertising if the additional sales were only likely to increase gross profit by £75,000.

Quantitative sales budget

The sales forecast is replaced by the quantitative sales budget. This represents a volume and mix provisionally acceptable by management and is regarded as tentative until it has satisfied certain conditions. These are –

- (i) a sales plan leads to a production plan and the latter can only be fulfilled if adequate *productive resources* are available. This problem is considered in Section 2 of this chapter (page 35),
- (ii) adequate *liquid funds* must be available to finance the overall plan. This aspect is considered in Section 9 of this chapter (page 62),
- (iii) the sequential chain of budgets, having possibly been revised more than once, may be provisionally acceptable until the *profit* budget is presented. Whether or not the overall plan is acceptable depends on how management view the profit in relation to capital employed. If the return is considered inadequate and it is thought that possibilities of improvement still exist, then the whole chain of budgets may be subject to review. The profit budget is considered on page 65.

Selling prices

The problem of pricing standardised products is complex. Competition,

supply-demand ratios, costs and company objectives, all have to be considered. These factors are examined below —

(a) *Competition.* An accepted generalisation is that prices should not compare unfavourably with those of competitors for similar products. This statement needs qualifying because similar products of different manufacture are never exactly alike and a product of superior quality or with additional desirable features compared with a competitive product may attract buyers, despite the price being higher. Nevertheless there is a limit to the differential which customers will pay for a particular commodity or service and they will need convincing that they are getting good value for the price paid. Sales may be lost by either under- or over-pricing. The potential customer often regards the price as an indicator of quality and may reject a commodity either because it is too cheap or too expensive.

(b) *Supply-demand ratios.* Price levels are often affected by the supply-demand ratio. In some instances, as in the case of copper, there are frequent fluctuations in available supply levels and prices tend to follow, whilst residential property is a typical example of long-term effects.

(c) *Costs.* Prices are not fixed in proportion to costs except in special circumstances such as cost-plus contracts in time of war. However, managers should know what the costs are so that productive resources can be concentrated on the most profitable combination of products. In this connection it is useful if marginal costs are known because, in times of temporary low demand, it may be necessary to cut losses by selling at reduced prices which yield some contribution to fixed overhead.

(d) *Company objectives.* The proposition that the price should be what the customer is prepared to pay is valid in a general sense but the question must arise — which customer? As suggested in Subsection (a), some customers may be prepared to pay more than the average market price, for real or imagined quality considerations. Market research may indicate, e.g.the following relationships between price and volume —

<i>unit price</i>	<i>expected sales (units)</i>
£2	100,000
£2.25	80,000
£2.50	30,000

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The company objective is usually to earn the maximum profit and this will influence the pricing decision, taking into account the financial disadvantage of low utilisation of productive resources.

Sterling sales budget

When it is established that productive resources are commensurate with the budgeted sales quantities, the latter are evaluated at net selling prices. By way of illustration, consider the sales budget of Lingrove Instruments Limited –

		£
Model Y	78,000 @ £26 =	2,028,000
Model Z	104,000 @ £20 =	<u>2,080,000</u>
		<u>4,108,000</u>

Alternatively, separate figures may be worked out for gross sales, sales returns, discounts and allowances, and net sales.

2. QUANTITATIVE PRODUCTION BUDGET

Product quantities

With the provisional sales budget available, the provisional quantitative production budget can be prepared. The planned production need not necessarily equate with planned sales, but an opinion must be formed as to what quantity of each (wholly or partly) manufactured product will be on hand at the commencement of the budget period and whether or not a higher or lower stock level is needed at the end of the period.

$$\begin{aligned} & \text{Budgeted sales minus expected opening stock} \\ & \text{plus required closing stock} = \text{required production.} \end{aligned}$$

Planning stock levels

(a) *Non-seasonal business.* The objective is usually to keep stocks just high enough to avoid failures to fulfill customers' orders. Delays in meeting demands are damaging to customer relations, but unnecessarily high stocks have the following disadvantages

- (i) higher application of working capital,
- (ii) higher cost of insurance,
- (iii) greater requirement of floor space and handling facilities,
- (iv) greater risk of deterioration and obsolescence.

(b) *Seasonal business.* If budgeted sales are unevenly spread throughout the year it is necessary to decide whether *stock level* or *production* is to be stabilised. If it is decided to stabilise production the disadvan-

tages of high stock levels are incurred but, on the other hand, some important advantages are gained. These are –

- (i) steady employment of workpeople resulting in better morale and lower labour turnover costs,
- (ii) reduction of costly overtime or idle time,
- (iii) avoidance of the need to increase plant capacity to handle peak production,
- (iv) maintenance of economical batch sizes.

Usually, these advantages outweigh the disadvantages and a constant level of production is preferred to constant stock levels, but all the factors relevant to the prevailing circumstances must be carefully considered before the decision is taken.

Adequacy of available resources

Having provisionally decided on the quantities to be produced the availability of the necessary productive resources must be checked. There is always the possibility that some new limiting factor will be revealed. Every endeavour must be made to solve each problem but insuperable difficulties may make it necessary to revise the production and sales budgets. This underlines one of the advantages of budgeting; it forces management to think more deeply, to anticipate difficulties and to take appropriate measures in good time.

Worked example The make-up of the two products of Lingrove Instruments Limited is as follows –

<i>Components made in machine shop</i>		<i>Bought components</i>	<i>Assembly</i>	
raw material A	raw material B			
YA			YA	} Model Y
	YB		YB	
		YC	YC	
ZA			ZA	} Model Z
	ZB		ZB	
		ZC	ZC	

The marketing manager’s initial forecast of sales is –

model Y 85,000
 model Z 100,000

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The production manager is asked to prepare a provisional production budget to test the availability of productive resources. In doing so he makes allowances for such changes in stock levels as may be considered desirable. His findings are –

- (i) that some additional personnel would be required but the personnel manager foresees no difficulty regarding recruitment,
- (ii) that machine capacity would be adequate,
- (iii) that required purchases of raw materials would be A 6,318,000 units B 4,725,000 units but the purchasing manager, after investigation, reports that material A is in short supply and the suppliers are prepared to allow a quota of 6,150,000 units for the year. Ample supplies of material B and of bought out components are assured.

The question now arising is how should material A be shared between the two models on which it is used? As the object is to maximise profit the product yielding the *highest contribution per unit of material A* should be given priority up to its full sales potential. The management accountant produces the following figures –

	<i>Model Y</i>	<i>Model Z</i>
contribution per instrument	£7.97	£6.25
units of material A per instrument	40	28
contribution per unit of material A	£0.199	£0.223

Clearly, Model Z makes the most profitable use of material A and must be given priority. It has been agreed that the stock of material A will be increased by 50,000 units during the year, that finished stocks of components YA and ZA will each be increased by 1000 and component ZB by 2000. The levels of work in progress and finished instruments are to remain unchanged. The production and sales managers, assisted by the management accountant, collaborate in revising the sales budget and in preparing commensurate production quantities. The expectation that a proportion of customers unable to obtain model Y will buy model Z is taken into account and the following quantities are mutually agreed –

	<i>Sales (revised)</i>	<i>Production</i>
model Y	78,000	78,000
model Z	104,000	104,000
component YA	–	79,000
component ZA	–	105,000
component YB	–	78,000
component ZB	–	106,000

Even though the above revised budgets are feasible in so far as productive resources are concerned they must be regarded as *tentative* until the cash flow and profit budgets have been approved.

Material usage budget

Direct materials. The significant factors are –

- (i) quantities of production listed in the production budget,
- (ii) measured quantities of material per unit of product specified in standard cost sheets.

The following usage quantities are shown in the Lingrove budget –

<i>Material A:</i>		<i>units</i>	
For component YA,	79,000 x 40	=	3,160,000
For component ZA,	105,000 x 28	=	<u>2,940,000</u>
			<u>6,100,000</u>

<i>Material B:</i>			
For component YB,	78,000 x 25	=	1,950,000
For component ZB,	106,000 x 25	=	<u>2,650,000</u>
			<u>4,600,000</u>

Bought components:

YC	<u>78,000</u>
ZC	<u>104,000</u>

Indirect materials. If there are important and costly indirect materials essential to production these are dealt with in the same manner as *direct* materials. The required quantities are budgeted in relation to the planned production. Purchase requirements are then determined by allowing for expected stock levels at the beginning and end of the budget period and the purchasing manager is asked to check that supplies will be available. *If not* suitable substitutes must be sought. In extreme circumstances a limiting factor situation may exist necessitating the revision of the production and sales budgets.

It would of course be illogical to apply this procedure to every one of the large variety of indirect materials. Time is not wasted, e.g. in attempting to quantify the number of files or hacksaw blades to be used. Sundry items of consumables may be grouped by category and included in the purchase budget and in the production overhead budget in terms of cost.

Personnel budget

Direct production personnel. The number of workpeople required to

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fulfill the production programme is established, and the number of each grade shown for each budget centre. This budget is prepared initially when the first draft production budget is available and it is adjusted in line with any subsequent revisions of the latter. The first objective is to enable the personnel manager to check that all scheduled personnel will be available when required. In the event of a shortage of certain skills, steps are taken to solve the problem by arranging for special training to be given to less skilled employees, by rearranging the spread of work or by planning overtime or shift working. If no solution to the shortage is found a limiting factor arises and budgets already tentatively adopted have to be revised. As indicated in paragraph b (page 34) fewer personnel problems arise when a constant level of production can be maintained.

The significant factors are

- (i) quantities laid down in the production budget,
- (ii) standard direct labour hours per unit of product as measured by the work study engineers and as specified on standard cost sheets.

The direct personnel requirements of the Lingrove company are —

<i>Standard hours</i>			
<i>Machining:</i>	<i>Components</i>	<i>per component</i>	<i>Total</i>
	YA 79,000	2	158,000
	YB 78,000	1	78,000
	ZA 105,000	1	105,000
	ZB 106,000	1	<u>106,000</u>
			<u>447,000</u>
<i>Assembly:</i>	<i>Instruments</i>	<i>per instrument</i>	
	Y 78,000	2	156,000
	Z 104,000	1½	156,000
			<u>312,000</u>

Note: Tea breaks and other concessions are allowed for in standard hours.

Conversion into men:

Annual direct hours per man –		
52 weeks of 40 hours	=	2080
less holidays 15 days	=	<u>120</u>
		1960
less Sickness etc. 10 days		<u>80</u>
		<u>1880</u>
	<i>Machining</i>	<i>Assembly</i>
Required man hours	447,000	312,000
(divide by 1880)		
Number of men		
(nearest whole number)	238	166

It is seldom possible precisely to equate the number of operatives in attendance with day to day work loads as sickness and other absences are unpredictable. Some time, however, will be lost through absence, and an allowance, based on an estimate, is made in determining the number of men to be employed. When absenteeism is low there will be operatives surplus to requirements, and when it is abnormal overtime may be worked. Alternatively, reduced production may be tolerated over a short period of temporary difficulty and made good when the attendance situation is favourable. In some companies it is found possible to provide useful ancillary work for men temporarily surplus to requirements for direct operations.

Indirect production personnel. The number of each type or grade of employee required in each production or service budget centre, in relation to the planned production, is scheduled and submitted to the personnel manager who should report any possible shortages.

Personnel relating to other functions. The scope of the responsibilities of the personnel department varies from company to company. In some organisations the personnel manager is responsible for the engagement not only of workpeople but also of office staff and senior executives up to a specified level, whereas in others his function only covers workpeople including despatch department personnel. Whichever range of responsibility applies there may be some employees outside the production function to be included in the overall personnel budget. Details of

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these are given to the personnel manager by the executives in charge of the centres concerned.

The personnel budget so far discussed is in terms of numbers only. The remuneration aspect is dealt with within the context of the *wages cost budget* (see page 41).

Plant utilisation budget

Productive capacity. The productive capacity of each machine or other item of equipment is limited. Machines and conveyors are geared to operate at ideal speeds. Furnaces, kilns, presses, vats and the like have fixed cubic capacities. Up-to-date schedules of these capacities are maintained.

Loading. The allocation of work to different machines or other items of plant calls for considerable knowledge and experience and is usually the responsibility of work study engineers who may or may not be incorporated into the production planning function. Often there are alternative methods of carrying out a piece of work and the best is determined by the scientific application of method study. Ideally, the distribution of the work load indicated by the provisional production budget should result in the most economic utilisation of each part of the plant without overloading, a situation often difficult to achieve. The exercise may reveal bottlenecks or under-utilisation which cannot be obviated by re-distribution, in which case consideration must be given to the following alternatives

- (i) the acquisition of additional fixed assets,
- (ii) the institution of overtime or shift work at bottlenecks,
- (iii) the placing of work outside or the buying of ready-made parts instead of making them,
- (iv) the disposal of existing fixed assets,
- (v) the revision of sales and production budgets.

3. PRODUCTION COST BUDGET AND STANDARD PRODUCT COSTS

Materials cost budget

Direct materials. The budgeted cost of direct materials is simply the evaluation at standard prices of the physical quantities set out in the materials section of the quantitative production budget (see page 37).

Worked example

	<i>Quantity (units)</i>	<i>Standard price £</i>	<i>Cost (£)</i>
Material A	6,100,000	0.10	610,000
Material B	4,600,000	0.04	184,000
Component YC	78,000	5.39	420,420
Component ZC	104,000	4.53	471,120
			<u>1,685,540</u>

Indirect materials. Any important and costly items of indirect material, already quantified in the quantitative production budget, are valued by applying the standard unit prices. The numerous less important items are *estimated* in money terms although every effort is made to set reasonable standards related to the efficient use of such materials. The amounts arrived at are included in the budgeted overhead for the centres in which the materials are used.

Budgets without standard costs. Where standard costs are not used, the direct material cost of the budgeted production can be derived from estimated costs or from records of previous costs adjusted for estimated price changes. Such budgeted figures cannot however be regarded as representing the efficient usage of materials in the same way as those based on scientifically measured product cost standards, and cannot therefore be as effective as an instrument of control.

Wages cost budget

Valuation. The planned labour force having been established (page 38) it now remains to apply the standard wage rates including, if applicable, the incentive bonuses.

Fringe benefits. In addition to the budgeted remuneration the cost of fringe benefits such as employer's contributions to national insurance and pension fund and provision for holiday pay are calculated, but whether such benefits are classified as *wages* and averaged in the standard rates or are treated as *overhead expense* is a matter of company policy.

Direct wages. Applying the budgeted standard hours to the standard wage rates, the budgeted direct wages cost is arrived at. The Lingrove budget shows —

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	<i>Hours</i>	<i>Standard rate</i>	<i>£</i>
Machining	447,000	£1.25	558,750
Assembly	312,000	£1.00	312,000
			<hr/> <u>870,750</u>

(In this example, remuneration is based on hourly rates only. The treatment of incentive bonus in variance accounting is dealt with on page 86 formula 5.)

Direct wages – fixed or variable? Traditionally, direct wages have been treated as a *variable* production cost. During the twenty years between the two World Wars it was comparatively easy to equate direct labour to a changing work load as workpeople were dismissed or suspended and reinstated at short notice. After the second World War however the situation changed and, currently, employment is not jeopardised by short-term fluctuations in trade. Another factor tending to stabilise the size of the labour force is the trend towards automation requiring comparatively small teams of operators. These facts may be advanced in favour of treating direct wages as a fixed cost. It certainly would be impossible to justify the classification of direct wages as a variable cost in a plant such as paper making where material forms a high proportion of total cost and the wages cost is comparatively insignificant.

Common sense must prevail and systems must be devised with regard to the prevailing circumstances in all cases. However, situations such as that just described are not representative of industry in general. Considerably greater use of sophisticated machinery with a dramatic reduction in the employment of personnel is technologically feasible though politically unacceptable, and, given a reasonably healthy economic climate, the employment of workpeople on a vast scale is a feature of industry which may well continue for decades.

The following conditions apply to a high proportion of manufacturing organisations and favour the treatment of direct wages as a variable cost

- (i) direct wages can be identified with separate work elements which can be measured precisely. By setting scientifically based standards of performance for detailed production work, the direct hours required for a specific work load is accurately gauged with the result that the number of direct employees can be kept at a reasonable level,
- (ii) the number of direct workers employed is usually much more

flexible than most items of overhead as it may be adjusted to some extent to suit production volume trends by recruitment, overtime, non-replacement of leavers, short-time working or transfers to and from stand-by work,

- (iii) valuable control information concerning the efficiency of direct operatives is available by measuring actual performance against standard. To regard the wages of such operatives as a fixed cost could lead to an apathetic attitude towards control as efficiency would not seem to matter,
- (iv) to fail to take advantage of the fact that direct wages can be accurately identified with products would not be conducive to good costing, particularly in job order industries where accurate job costs are of paramount importance. In many mass production situations product costs are ascertained either within the routine system or by *ad hoc* exercises.

Indirect wages. The standard wage rates are applied to the employees scheduled in the personnel budget and the budgeted cost of indirect wages for each budget centre is thus established.

Budgets without standard costs. Where standard costs are not used, the wages cost of the budgeted production can be formulated from estimates or from records of previous costs adjusted for estimated changes in pay rates. As in the case of material, such budgets are much less effective as instruments of control than when based on scientifically computed cost standards related to efficient performance.

Production overhead budget

Budget centres. That part of the organisation which is concerned with the production function consists of numerous budget centres. In some of these, production is actually carried on but others such as production control, material stores, tool room, maintenance, etc. only provide services to other budget centres.

The executive in charge of each budget centre prepares and/or approves a budget of running costs for the budget period. He is responsible for controlling, as far as possible, his actual running costs so that they do not exceed the budgeted amounts. If he can effect economies so much the better.

Marginal and absorption concepts. There are significant differences between the marginal and absorption concepts as applied to production

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overhead. In the former only variable costs are charged to products, the fixed costs attributable to a relevant period being written off in full against the contribution for that period. When the absorption principle is adopted, both fixed and variable costs are included in product costs. The pros and cons of the opposing concepts are set out in Chapter 9. Where standardised products are manufactured for stock and variance accounting is incorporated into the routine system the emphasis is very much on *control* rather than the ascertainment of product costs which include portions of all costs incurred. The marginal concept is more appropriate to such cases and its adoption by *Lingrove Instruments Limited* is assumed.

Treatment of general costs. Students of costing are familiar with exercises whereby overhead items of a general nature are distributed over cost centres, e.g. rent, apportioned in proportion to floor space occupied by the different centres. Such procedures are valid in systems which aim at the ascertainment of complete product costs as, e.g., in job order work, but to apply them to mass production situations where variance accounting is in use hinders rather than assists the attainment of control. The significance of an increase in local government rates is more clearly grasped if looked at in entirety rather than in dispersed fragments, and cost variances which have occurred in a budget centre are more readily assimilated if not mixed with portions of variances which have occurred elsewhere.

Service budget centres. The costs incurred in running most service budget centres are fixed in relation to production volume. *Material store*, e.g., is usually established with sufficient capacity in terms of physical area, equipment and personnel to deal with all potential demands by the centres likely to require material and, whether, in a particular period, demands are greater or less than normal, does not influence the running cost.

The stores manager, in preparing his budget, makes sure that his planned arrangements are geared to the production programme for the budget year. The budget is made up in detail, the largest item being the remuneration of the different grades of stores personnel. If the marginal concept applies, portions of general costs such as rent, rates and production administration are not included, nor is the cost of running the stores distributed over the centres served by the stores. The comparison of budgeted and actual costs is thus reasonably straightforward.

In rather rare circumstances *measurable services* such as process

steam and internally generated electrical power are provided and the *variable* costs of such services are charged to the user cost centres according to metered usage. Expected *variable* costs are included in the budgets of the user centres.

Breakdown of plant is difficult to predict and costly when it occurs. Usually a breakdown demands immediate attention if expensive disruption of production is to be avoided. A repair commenced during normal working hours is often continued at overtime pay rates. The modern answer to this problem is *planned preventive maintenance* which aims at systematic overhaul, inspection and lubrication of all important items of plant and the avoidance of costly breakdowns. By careful planning, each item is scheduled to receive attention at regular intervals and the work load is spread throughout the year thus reducing idle time and overtime. Unexpected breakdowns cannot be entirely prevented but can be greatly reduced by this procedure.

Planned preventive maintenance is compatible with control through budgetary procedure. Estimated allowances are made for emergency repairs.

Repairs and maintenance work takes place in different budget centres, is measurable by orthodox costing methods and can therefore be allocated to the centres concerned. If absorption costing applies, the fixed costs of the centralised maintenance department such as the salaries of the maintenance manager and his clerical assistants are apportioned proportionately over the allocated costs and thus passed on to the centres in which the work is done. In marginal costing the centralised administration costs are not apportioned. The budget of each production centre therefore includes costs of repairs and maintenance expected to be carried out within the centre and should therefore be mutually approved by its supervisor and the maintenance manager.

The ideal situation would be for preventive maintenance to be so effectively organised and executed that emergencies did not arise. In such circumstances it could be argued that the maintenance manager was exclusively responsible for the costs and that control was not aided by passing them on to other budget centres. Whether or not such perfection is attainable is debatable and in the most usual situation frequent breakdowns occur, often through faulty handling of plant by production workpeople. It is also generally accepted that repair costs are partially influenced by production intensity. These considerations support the allocation procedure.

Variable production overhead. The overhead for each production

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centre is budgeted, care being taken to distinguish the variable category from the fixed; this includes apportionment of semi-variable items. The variable overhead budgeted for each production centre is a significant factor in the determination of charging rates to be applied in the computation of standard costs, the other factor being the number of standard hours budgeted for the particular production centre.

Standard *machine hours* are often preferred where the work of the centre is predominantly mechanical, particularly in the case of job order production where it is desired to include in job costs such items as depreciation and costs of floor space. Standard *man hours* are used where the work is mainly manual. Lingrove's variable overhead is related to standard man hours, thus —

	<i>Budgeted variable overhead</i>	<i>Budgeted standard hours</i>	<i>Rate per std hour</i>
Machining	£44,700	447,000	10 pence
Assembly	£24,960	312,000	8 pence
	<u>£69,660</u>		

Fixed production overhead. Separate budgets are prepared for each budget centre within the production function. As many items of fixed overhead occur annually, or in relation to other periods of time which do not coincide with control periods, the amounts attributed and charged to particular periods are based on accountancy decisions which take into account the spread throughout the year of benefits derived from the expenditure rather than dates of payment. Seasonal factors are also taken into account when they arise. For example, heating and lighting costs are heavier in winter than in summer.

A controversial point arises concerning such time-based expenses as rent, rates, insurance and monthly salaries. Should more be related to a month of twenty-one working days than to one of eighteen? In some companies one-twelfth of an annual cost is attributed to each calendar month whilst, in others, it is considered that the greater precision achieved justifies the work of relating sales and production volumes and fixed overhead to the number of working days in each calendar month. The same principle applies to four-weekly periods as these do not always consist of twenty working days because of bank holidays, etc.

Controllable costs. Theoretically, in variance accounting a budget centre should only be charged with costs which can be influenced by the actions of the person in whom control of the centre is vested. Items such as rent, which are outside the control of the centre's super-

visor are not apportioned over centres but measurable services such as process steam are charged to centres at *standard rates* per unit of service used, such usage being within the supervisor's control. *Theory must however yield to practical considerations.* It is impracticable to apply a set of rules whereby the only costs chargeable to a budget centre are those fully controllable by the person in charge. For example, whilst excessive scrap may possibly arise from faulty supervision it may also result from some latent defect in purchased material. Heavy repair costs may arise in consequence of careless treatment of equipment or from mechanical trouble for which the centre's personnel are in no way to blame. A reasonable principle to observe is that

costs which are incurred *by* the centre are chargeable thereto but responsibility for variances is *sub judice* until all circumstances have been considered.

Standard product costs

Definition. A standard cost is a predetermined cost calculated in relation to a prescribed set of working conditions, correlating technical specifications and scientific measurements of materials and labour to the prices and wage rates expected to apply during the period to which the standard cost is intended to relate, with an addition of an appropriate share of budgeted overhead. Its main purposes are to provide bases for control through variance accounting, for the valuation of stocks and work in progress, and, in exceptional cases, for fixing selling prices.

Level of achievement. The standards set may reflect —

- (i) absolute perfection,
- (ii) average past attainment,
- (iii) good attainable performance.

These are now considered.

- (i) When standard costs are based on *absolute perfection*, actual results always compare unfavourably. However hard an executive strives for a good result, he soon learns that he 'cannot win' and is thereby discouraged. Management find it difficult to judge praiseworthy performance because, on paper, all performances are bad. Further disadvantages are that related budgets are unrealistic and inventories are under-valued.
- (ii) When *average past performance* is the basis of a standard cost,

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inefficiencies remain hidden and poor performance is accepted as normal.

- (iii) *Good attainable performance* is generally accepted as the most satisfactory basis for the setting of standard costs as it leads to effective control as well as realistic valuations and profit estimates.

Standard hours. Standard direct labour hours are calculated by the work study function and may be used—

- (i) for setting standard direct labour costs,
- (ii) as a common measure of production where no other unit of measurement can commonly be applied to the product variety,
- (iii) for personnel budgeting and labour control,
- (iv) for production planning, machine loading and scheduling,
- (v) as a basis for incentive payment systems.

Differing definitions of the term ‘standard hour’ are recognised in different situations. In some cases variance accounting is not in use but standard hours are significant in the wages structure. Numerous forms of incentive systems are in use whilst wages in some companies are at hourly rates. The following example relates to incentive payments —

Basic hourly rate £1.20	<i>minutes</i>
Time study shows that, with motivation, and with allowances for rest periods etc one unit should take	15
Bonus factor added (one-third)	<u>5</u>
Allowed time	<u>20</u>

Operative produces 160 units in 40 hours
Payment: $53 \frac{1}{3}$ standard hours @ £1.20 = £64
(i.e. one-third above basic rate)

In some companies the 20 minutes *allowed* per unit would be regarded as the standard time or ‘standard minutes value’ whereas, in others, standard time (15 minutes) would be distinguished from ‘allowed time’ (20 minutes). Where incentives are not featured in the wages structure there is no need for such distinction. Without ‘motivation’ the standard times would be greater.

For purposes of variance accounting it is appropriate to regard the bonus factor as extraneous to standard hours so that a valid comparison can be made between actual hours worked and standard hours produced. This basis is also more suitable for personnel budgeting. Care must, however, be taken to include the bonus factor in the standard cost.

Standard hour (or minute) is defined –

A standard hour (or minute) is a pre-established unit representing the output of work which a worker is expected to achieve in one hour (or minute) as an average over the working day or shift. The expected rate of output is one which –

- (a) relates to an average qualified worker,
- (b) relates to the prescribed method of work,
- (c) allows for appropriate periods of relaxation, taking into account the nature of the work, so that over-exertion is avoided,
- (d) takes into account whether or not the worker is motivated by a method of payment based on his productivity.

Standard wage rates. These represent the average rates expected to prevail during the budget year. In some cases *fringe benefits* are included (see page 41).

Standard material specifications. These are determined by the technical function.

Standard material usage quantities. These are based on *input*, that is to say they are inclusive of reasonable allowances for offcuts and wastage.

Standard prices. These represent the average prices expected to prevail during the budget year. If carriage is not included in the supplier's price an estimated amount is added. Quantity and trade discounts, but not settlement discounts, are deducted. The prices are scheduled by the purchasing department and are also used in connection with the purchase budget (see page 61).

Substantial savings can often be effected by bulk buying but such savings must be measured against the additional stock-holding costs incurred. To illustrate, assume that component ZC, of which the Lingrove company plans to buy 105,000 in the budget year, is offered by the manufacturers at five different unit prices ranging from £4.85 for lots of 5000 to £4.20 for orders of 100,000 or over. In addition to the quantity price differentials there are savings in clerical costs when fewer orders are placed. Each order gives rise to clerical work in connection with ordering, receiving and inspecting, invoice processing and book-keeping entries, in addition to the cost of printed forms. Whilst in this particular worked example these clerical costs are dwarfed by the costly purchases they can be quite significant with cheaper purchases.

Whilst price differentials and clerical costs favour large orders,

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buying in large quantities results in larger average stock levels and consequently in higher stock holding costs. Apart from the cost of storage itself, the locking up of funds can be expensive. Borrowing entails high interest costs but if money is available within the organisation the *opportunity cost* cannot be ignored. Opportunity cost is the value of a benefit sacrificed in favour of an alternative course of action. In this particular case if the finance was not allocated to stock holding it would be available for an alternative profitable use or for lending at interest. Statement 1 (below) sets out the comparative figures and indicates that the *economic ordering quantity* for component ZC is 21,000, the price being £4.53 per unit.

ANNUAL COST OF PURCHASING 105,000 (ZC) COMPONENTS

Order quantity	105,000	52,500	21,000	10,500	5,000
DATA:					
Number of orders per annum	1	2	5	10	21
Net price each (£)	4.20	4.40	4.53	4.70	4.85
Average stock level	52,500	26,250	10,500	5,250	2,500
Average stock value (£)	220,500	115,500	47,565	24,675	12,125
ANNUAL COST					
	£	£	£	£	£
Net invoice value	441,000	462,000	475,650	493,500	509,250
Clerical costs (£10 per order)	10	20	50	100	210
Storage (50p per unit of average stock)	26,250	13,125	5,250	2,625	1,250
Interest on capital (12½% of average stock value)	27,562	14,437	5,946	3,084	1,516
TOTAL:	494,822	489,582	486,896	499,309	512,226

STATEMENT 1 – *Ascertainment of the Economic Ordering Quantity.* This exercise offsets storage and interest costs against the benefits of price concessions and lower clerical costs derived from bulk buying. Specifically, it indicates that the economic ordering quantity is 21,000 units.

Standard overhead rates. The setting of absorption rates for variable overhead is exemplified on page 46.

Standard cost sheet. This is exemplified by Statement 2 (below). It is a document which provides for the assembly of the detailed standard

Lingrove Instruments Limited				1 April 19—				
STANDARD COST SHEET								
MACHINING COMPONENTS								
	YA		YB		ZA		ZB	
Direct materials	<i>units</i>	£	<i>units</i>	£	<i>units</i>	£	<i>units</i>	£
A @ 10p per unit	40	4.00			28	2.80		
B @ 4p per unit			25	1.00			25	1.00
Direct wages	<i>hrs.</i>		<i>hrs.</i>		<i>hrs.</i>		<i>hrs.</i>	
@ £1.25 per hour	2	2.50	1	1.25	1	1.25	1	1.25
Variable overhead								
@ 10p per hour		0.20		0.10		0.10		0.10
		<u>6.70</u>		<u>2.35</u>		<u>4.15</u>		<u>2.35</u>
ASSEMBLY				MODEL Y		MODEL Z		
Manufactured components:				£			£	
YA			(1)	6.70				
YB			(1)	2.35				
ZA					(1)	4.15		
ZB					(1)	2.35		
Bought out components								
YC			(1)	5.39				
ZC					(1)	<u>4.53</u>		
				<u>14.44</u>		<u>11.03</u>		
Direct wages @ £1 per hour			<i>hrs.</i>		<i>hrs.</i>			
Variable overhead @ 8p per hour			(2)	2.00	(1½)	1.50		
				<u>0.16</u>		<u>0.12</u>		
<i>Variable production cost</i>				<u>16.60</u>		<u>12.65</u>		
Variable marketing cost				<u>1.43</u>		<u>1.10</u>		
(5½% of selling price)								
<i>Total variable cost</i>				<u>18.03</u>		<u>13.75</u>		
<i>Contribution</i>				<u>7.97</u>		<u>6.25</u>		
<i>Selling price</i>				<u>26.00</u>		<u>20.00</u>		

STATEMENT 2 – Standard Cost Sheet (Marginal Concept). Standard cost sheets are designed to suit particular products and types of manufacture. Usually a separate sheet (or card) is prepared for each product. The simplified example above forms part of the hypothetical exercise.

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cost of a unit or batch of product. The selling price and the contribution or profit may also be shown. The standard cost sheet provides vital data for purposes of direct labour and material budgets and fulfills an important role in connection with variance analysis.

Work study. The term work study embraces the techniques of *method study* and *work measurement* which are employed to ensure the most efficient use of materials, equipment and human effort. In the two subsections which follow each of the component techniques is considered in turn.

Method study. In this technique specific tasks are studied with a view to improving methods of production and achieving the most effective use of the productive resources. The principal stages are —

- (i) *selection* of the work to be studied,
- (ii) *examination* of all features of the present method (e.g. purpose, place, sequence, persons and means),
- (iii) *development* of an improved method under prevailing circumstances,
- (iv) *installation* of the improved method by planning, arrangement and implementation,
- (v) *maintenance* of the improved method by periodical verification that it is still in operation.

Work measurement. This technique determines the times required for the performance of specific tasks with a view to providing a basis for the formulation of sound incentive schemes or to providing reliable time standards for manufacturing processes, thereby facilitating better production planning and cost control. Incentive bonus systems demand a high degree of accuracy and this is provided by the work measurement technique. Where incentive bonus is not a feature of the wage structure, control of efficiency through variance analysis is even more important and standards based on scientific work measurement are much more reliable and effective than if formulated by less precise means. The use of the technique also leads to more dependable budgeting of personnel requirements. The principal stages of work measurement are

- (i) *Selection* of the work to be measured,
- (ii) *Measurement.* The work is broken down into its elements and each element is measured either by *time study* or by *analytical estimating*. Time study is particularly suitable for the measure-

ment of repetitive work. It consists of timing each element of the task by stop watch and then aggregating the times. Analytical estimating is applied to non-repetitive work where the opportunity of making actual time studies does not arise. Where certain elements of the task are of a repetitive nature the established times are applied but times for the remaining elements must be estimated. The elemental times are then aggregated.

- (iii) *Derivation.* A work unit value in terms of time is derived from the aggregate of the elemental measurements.
- (iv) *Establishment.* Any justifiable allowances are added to the derived value and an allowed time for the task is established.

Summarised production cost budget

The budgeted cost of finished production can be arrived at in two different ways –

- (i) by summarising the separate budgets for direct materials, direct wages and overhead and adjusting for cost values of planned changes in work in progress and/or stocks of manufactured components,
- (ii) by multiplying budgeted production quantities by standard product costs.

Examples follow –

Method (i), from budget totals

	£
Direct materials (see page 41)	1,685,540
Direct wages (see page 42)	870,750
Variable overhead (see page 46)	69,660
	2,625,950

less planned additions to stocks:

	£
YA 1000 @ £6.70	6700
ZA 1000 @ £4.15	4150
ZB 2000 @ £2.35	4700
	15,550
	2,610,400

Method (ii), from standard product costs
(See Statement 2, page 51)

Model Y 78,000 @ £16.60	1,294,800
Model Z 104,000 @ £12.65	1,315,600
	2,610,400

4. GENERAL ADMINISTRATION EXPENSE BUDGET

General administration expense

This comprises all costs of general management and secretarial, accounting and administrative services which cannot be directly related to the production, marketing, research or development functions of the enterprise. Such costs are not usually affected by short-term fluctuations in the volume of production or sales and are therefore regarded as *fixed*. The major item is salaries. Where the salary policy of the company and the organisation plan are firmly established the most likely deviation to arise results from unexpected changes in administrative personnel. Most other items of expenditure included in the budget are reasonably predictable by reference to past experience modified by planned changes in the procedures or by allowances for inflationary trends.

Responsibility centres

These are few. Examples are —

<i>Centre</i>	<i>Responsibility of</i>
General management	General manager
Secretarial	Company secretary
Accounting	Chief (or management) accountant
General offices	Office manager

Each of the above executives prepares his budget, tentatively at first, and finally when approved by the head of the organisation.

5. MARKETING EXPENSE BUDGET

Scope

This budget relates to costs incurred in publicising and presenting to customers the products of the undertaking in suitably attractive forms, together with the costs of all relevant market research work, the securing of orders and, usually, delivery of the goods to customers. In certain cases after-sales service and/or order processing may also be included. Subsidiary budgets are usually prepared for selling, publicity and distribution.

Selling expense budget

This relates to that portion of marketing cost which is incurred in securing orders.

Budgeting selling expense. This is rather akin to budgeting general administration expense, being largely a matter of recording policy decisions; e.g., to employ so many salesmen at known remuneration scales. With one exception – commission on sales, where this applies – the costs are *fixed* because management commit themselves to a certain size and type of sales organisation which is considered appropriate to the plan of campaign. In the field of selling there is much less relationship between cost and achievement than in manufacture. Regardless of the time and effort devoted to a prospective sale, the decision ultimately depends on the whim of the customer and the outcome could be negative through no fault of the salesman. On the other hand, orders may come ‘out of the blue’. To sum up; the sales force is set up, maintained and paid for, irrespective of the results obtained.

Area organisation. Each location having its own manager is a budget centre. A separate budget is prepared for sales headquarters and for each area, and the separate budgets, when approved, are incorporated into a summary budget. Before approving area budgets, the head sales manager makes searching comparisons, aided by such ratios as *expense per cent of sales value*, but in so doing makes due allowances for differences between sales areas which cause comparable costs to be higher in some areas than in others; e.g. Area A – industrial, densely populated, short distances between calls. Area B – rural, long journeys between calls. Items of area expenditure such as rent, rates, insurance, lighting and heating and stationery are reasonably predictable. Detailed statements of costs incurred in previous periods provide a useful guide but are not accepted without critical examination.

Commission on sales, when applicable, is simply calculated by applying the specified percentages to sales budgeted for the salesmen concerned. Such payments are *variable with sales volume*.

Analyses. Budgeted selling expenses are analysed into different categories, e.g. –

- (i) by areas and salesmen,
- (ii) by types of outlet (wholesalers, supermarkets, other retailers, government departments, export),
- (iii) nature of expenditure (travelling expenses, etc.),
- (iv) control periods.

Publicity expense budget

This relates to that portion of marketing expense which is incurred in advertising and promotion as aids to the eventual sales of goods or services. Such expense is *fixed* in nature.

Budgeting by appropriation. Budgets for publicity expense present little difficulty as the amount to be spent is pre-determined by a management decision. A question which arises is whether the appropriation should be in the form of a 'block' allowance or should detail the limits of spending on specific projects or through different media. The usual course is that –

- (i) the advertising manager submits proposals in detail with estimates of cost and likely effects on turnover. These proposals are considered in arriving at the sum to be authorised,
- (ii) a 'block' appropriation is made but the actual allocation to different projects and media is left to the discretion of the advertising manager so long as the authorised total is not exceeded.

Packaging design. The definition of marketing expense given at the commencement of this section includes the words 'in suitably attractive forms'. This applies to many products where sales promotion is aided by the attractiveness of the pack, e.g., breakfast cereals, chocolates, tobacco, perfume and cosmetics. In such cases the design of the printed cartons, tins, etc., is often the responsibility of the advertising manager, although the work of packing the product falls within the production function.

Sequence. The publicity budget is often finalised before the sales budget, as sales prospects are largely influenced by the extent of spending on publicity.

Distribution expense budget

This relates to that portion of marketing cost incurred in warehousing saleable products and in delivering products to customers. In exceptional cases, e.g. where heavy industrial equipment is supplied, distribution may be regarded as an extension of the production function. Four distinct sub-functions are recognisable –

- (i) warehousing,
- (ii) packing for despatch,
- (iii) despatch,
- (iv) carriage.

The separate budgets for the sub-functions, when finally approved, are summarised, thus forming the distribution expense budget. Separate figures are shown for *fixed* and *variable* expense.

Warehousing. The main item of expense is the remuneration of the warehouse personnel. Assuming the adoption of the marginal principle, portions of such overall costs as rent, rates and insurances are not included in this budget. The number and types of workers to handle products received from the factory, to place them in the allotted locations, and to select and pass them on to the despatch packers as required, are planned. A prerequisite, however, is the planning of stock levels (page 34) and of sales quantities, as these factors determine the amount of work to be done in the warehouse. Remuneration rates are applied and the budgeted expenditure calculated.

As for material stores, the manning of the warehouse is usually planned with reasonable allowance for fluctuating demand levels and so is a *fixed cost*.

Packing for despatch. It is important to distinguish packing for despatch from the work of placing the goods in forms of container in which they reach the consumer. For example, when breakfast cereal is sold over the retail counter the consumer receives it in waxed paper and a printed carton. As the customer would probably not accept it otherwise, such packaging is in effect *part of the product* and is the responsibility of the production function (see 'Packaging design', page 56). On the other hand, packing for despatch falls within the distribution function.

The main items of expense are wages and materials such as cases, cartons and tape. Unlike the warehousing situation, the costs tend to relate to the volume of work and are therefore classified as *variable with sales*. Work study may be used for setting cost standards for packing orders for despatch. This is simple when a substantial part of the output consists of standardised packs such as groceries, paint, etc. Even in less standardised situations where a variety of items make up a customer's order, reasonably useful performance and material usage standards can be set for packing containers of certain sizes.

Budgeting labour requirements for this work is similar to budgeting production personnel requirements (page 38) and the conversion into wages costs is merely a matter of applying the standard wage rates plus any incentive bonus applicable.

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Despatch. This function combines clerical duties in writing out despatch notes with some manual work in loading the vehicles. A comparatively small team is required. Whether their remuneration is treated as a fixed or semi-variable cost depends on the degree of flexibility introduced. Ideally, a nucleus staff is established and additional workers are moved from other centres as required. In such circumstances the wages incurred in the centre are treated primarily as a *semi-variable* cost and then apportioned into fixed and variable categories.

Carriage. Alternative means of transport are usually available and the arrangements require careful planning in the interests of effectiveness and economy. The costs of carriage by public road and rail services and by the use of the company's vehicles are compared. Having decided on the service or services to be used, costs are budgeted in relation to the budgeted sales. The estimate may be based on recorded costs already incurred, due allowance being made for increases in rates. Carriage costs are related to distance but, for budget purposes, average distance is usually assumed and the cost is expressed in terms of the most convenient unit of measurement (usually weight). Carriage costs are *variable with sales*.

Marketing expense summary

The separate marketing expense budgets are summarised. To illustrate, the Lingrove summary is shown below –

Marketing Expense Budget Summary

	<i>Fixed</i>	<i>Variable with sales</i>
Distribution:		
	£	£
Warehousing	8,000	
Packing for despatch		12,000
Despatch	2,700	2,940
Carriage		211,000
	<hr/>	<hr/>
	10,700	225,940
Selling	52,000	
Publicity	40,000	
	<hr/>	<hr/>
	102,700	225,940

6. RESEARCH AND DEVELOPMENT BUDGET

Research cost is the cost of seeking new or improved products, applications of materials or methods; whereas *development* cost is the cost of the process which begins with the implementation of the decision to produce a new or improved product or to employ a new or improved method, and ends with the commencement of the formal production of that product or by that method. Where vast sums are spent on research and development, e.g. with pharmaceutical products, two separate budget centres are set up but in other cases, one budget centre covers both functions.

As with publicity budgeting is done by *appropriation* so that the amount to be spent is pre-determined by management policy decision.

7. CAPITAL EXPENDITURE BUDGET

Capital expenditure

This is the original or additional expenditure on fixed assets.

Tentative proposals to invest in new buildings and equipment are embodied in the long-term strategy (page 23). For purposes of the *current* budget, however, the capital expenditure to be incurred in the forthcoming year is more precisely detailed.

Appropriation basis

As with publicity, and research and development, budgeting is by means of *appropriation* so that the amount is pre-determined by a management decision. Major items are usually detailed with a specified appropriation for each, whilst less important items – those costing less than a specified sum – are often lumped together and covered by a ‘block’ appropriation.

Applications for authorisation

These arise from –

- (i) the long-term plan of development,
- (ii) the need to replace worn out and obsolete assets or to install additional assets to meet the requirements of the production programme, as revealed by the plant utilisation budget (page 40),
- (iii) the need for new vehicles in connection with administration, selling and distribution,
- (iv) the need for new office equipment,
- (v) the need for new equipment for research and development.

Control of expenditure

Strict control is essential and unauthorised capital expenditure by departmental managers is prohibited, *firstly* because this ensures that all capital expenditure is consistent with the overall long-term policy and, *secondly*, so that no liquidity difficulties are created.

Priorities

With a company having ample funds available, all requests for justifiable appropriations may be granted. Often, however, limited funds must be allocated with great care in order to preserve liquidity. Usually the *most urgent* projects are given priority although the amounts of money concerned are also taken into consideration. A capital project may be abandoned if a *discounted cash flow calculation (yield method)* indicates that the probable rate of return would be below that laid down by management as a criterion.

8. PURCHASE BUDGET

Definition

The purchase budget is a statement of the purchases expected to be made during the budget year. It has numerous distinct sections examples of which are raw materials, components, indirect production materials, packing materials, office supplies, sales literature, purchased services and capital items.

Purposes

These are –

- (i) to enable a planned purchasing programme to be developed,
- (ii) to provide an indication of outward cash flows for the purpose of the cash flow budget.

Direct materials

Annual purchase quantities. The quantities of raw material and bought out components required for production having been determined, the company policy for *stock levels* is taken into account. Reverting to the hypothetical case of *Lingrove Instruments Limited* for which the direct material usage quantities were indicated on page 37, the quantities to be purchased are now determined.

<i>Raw materials (units):</i>	A	B
Usage	6,100,000	4,600,000
Provision for increase in stocks	50,000	50,000
To be purchased	<u>6,150,000</u>	<u>4,650,000</u>
<i>Components (units):</i>	YC	ZC
Usage	78,000	104,000
Provision for increase in stocks	—	1,000
To be purchased	<u>78,000</u>	<u>105,000</u>

Cost of purchases. The setting of standard material specifications and standard prices is referred to on page 49. Lingrove's budgeted cost of purchases of direct material is —

	<i>units</i>	<i>£</i>	<i>£</i>
Raw material A	6,150,000 @	0.10	615,000
Raw material B	4,650,000 @	0.04	186,000
Component YC	78,000 @	5.39	420,420
Component ZC	105,000 @	4.53	<u>475,650</u>
			<u>1,697,070</u>

Ordering time scale. In planning the provisional time scale for ordering supplies it is recognised that, from time to time, circumstances may necessitate alterations. The initial considerations are —

- (i) the supply requirements of the production centres as indicated by the production budget,
- (ii) the average lead time (i.e. the time lag between sending the order and receipt of the goods),
- (iii) the economic ordering quantities (see page 50).

Circumstances which may necessitate revisions are —

- (i) deviations from the production budget (These are automatically reflected in an ordering procedure based on stock control records in which a purchase requisition is initiated when a reorder level is reached),
- (ii) opportunities for speculative buying when prices are unstable,
- (iii) in job order situations, the unpredictable content of customers' orders.

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Capital items

The items to be purchased, the prices (where already ascertained), and the time scale are detailed in the capital expenditure budget (page 59). If preferred, capital expenditure may be omitted from the purchase budget as there is no difficulty in giving effect to the authorisations separately in the preliminary cash flow forecast and the detailed cash flow budget (page 63).

Other items

As explained on page 37, the numerous items are grouped by category, the estimated requirement of each category being expressed in terms of cost. Exceptionally, individual items incurring heavy outlay may be assessed quantitatively as well as in monetary terms in the same way as the principal direct material items. Particulars are derived from the appropriate functional budgets.

Summary

On completion of the various sections of the purchase budget, the summary is prepared. Lingrove's purchase budget summary is detailed below –

	£
Direct materials (see page 61)	1,697,070
Indirect materials (production)	203,930
Other materials and purchased services	100,000
Total (excluding capital expenditure)	<u>2,001,000</u>

In practice the above budget would be broken down into control periods.

Analysis by control periods

The cash flow budget is usually subdivided into calendar months and in this case it is advantageous to adopt the same basis for the purchase budget even if the production and sales budgets are subdivided into four-weekly periods.

9. CASH-FLOW BUDGET

Purpose

If an enterprise is to survive, it must remain solvent. Inadequacy of cash resources to meet obligations may temporarily be bridged by expensive borrowing but if this state of affairs is not quickly rectified disaster is

inevitable. The opposite extreme, maintaining an excessive bank balance as a safeguard against insolvency is bad financial management which wastes potential earning power. The maintenance of adequate but not excessive liquidity can be achieved by systematic budgeting and control of the flow of funds.

Requisite data

These are –

- (i) receipts from customers based on the sales budget and making allowance for the length of the collection period and the policy regarding settlement discounts,
- (ii) other receipts such as dividends on investments, interest on loans, rents, etc.,
- (iii) payments to suppliers of goods and services based on the purchase budget and making allowance for the average period of credit taken and for settlement discounts,
- (iv) payments of wages and salaries according to payment dates,
- (v) other payments such as rent, rates, tax, dividends, debenture interest, etc. Care is taken to exclude any item which is within the purchase budget as a purchased service.

Preliminary forecast

The production and sale of goods requires working capital as the running costs of the enterprise are met some time before sales are paid for by customers. In general, increased production requires additional working capital. It is possible for a situation to arise where numerous difficulties regarding availability of materials, personnel and plant capacity have been overcome only to find that shortage of funds constitutes a limiting factor. It is therefore necessary that, before the budgets are formally adopted, they should satisfy the requirement that throughout the budget period there will be sufficient cash to finance the operations.

In the event of an unfavourable liquidity situation being indicated by the preliminary forecast a solution must be sought, e.g. cuts in stock levels or in expenditure on new plant, advertising and research. A last resort would be to reduce the scale of operations and to revise the budgets accordingly.

The budget

This is eventually compiled. There follows an example related to *Lingrove Instruments Limited*.

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	£	£
<i>Bank balance at 1st April 19—</i>		80,000
INFLOW:		
Collections from customers	4,000,000	
Dividends from investments	10,000	
	<u>4,010,000</u>	4,010,000
		4,090,000
OUTFLOW:		
Payments for materials and services	2,000,000	
Wages and salaries	1,400,000	
Rent, rates, etc.	250,000	
Capital expenditure	100,000	
Corporation tax	100,000	
Debenture interest	16,000	
Dividend	150,000	
	<u>4,016,000</u>	4,016,000
<i>Bank balance at 31st March 19—</i>		<u>74,000</u>

The next step is to break down each item into the twelve or thirteen control periods. Some financial managers go further and budget for single weeks, especially if there is a liquidity problem, but this is the exception rather than the rule. *The calendar month* is usually preferred as it coincides with commercial practice as to the grouping of transactions and the settlement of accounts among companies (See page 62.)

Periodical revision

The cash balance at the commencement of any month is unlikely to correspond with the budgeted balance. Moreover, as the year progresses certain trends may vary from expectation and plans may be revised. An out-of-date cash flow budget is misleading and so it should be revised at least monthly, in line with the latest available information.

CHAPTER 5

Summaries, Revisions and Adjustments

1. SUMMARY BUDGETS

Stock valuation revision variance

This is the difference arising when stocks and work in progress which are valued at standard costs are revalued at new standard costs. This variance occurs particularly at the commencement of a new financial year (see Statement 3, page 66). Though traditionally referred to as a variance it is really a difference between two sets of standards, whereas the term 'variance' usually refers to a difference between a standard and an actual result. Standard costs established for use in a new budget year usually differ from those which they supersede but it is desirable to open the new accounts with stocks valued at the new rates. It is more correct to deal with the adjustment in the profit budget (see Statement 4, page 67) than to account for it later as though it were a deviation from plan.

Profit budget

This may be either –

- (i) as fully detailed as Statement 4, or
- (ii) a more concise statement which commences with the budgeted contribution based on the margins shown on the standard cost sheets (as Statement 2, page 51), i.e. £1,271,660.

In each case the stock valuation variance (or adjustment) must be brought into account.

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Lingrove Instruments Limited SUMMARY OF STOCK VALUES						
Year commencing 1 April 19—						
	OPENING STOCK			CLOSING STOCK		
	<i>Units</i>	<i>Bro./ fwd. value</i>	<i>Valued at new stds.</i>	<i>Units</i>	<i>Per unit</i>	<i>Value</i>
Raw materials		£	£		£	£
A	400,000	36,000	40,000	450,000	0.10	45,000
B	300,000	12,000	12,000	350,000	0.04	14,000
		<u>48,000</u>	<u>52,000</u>			<u>59,000</u>
Bought components						
YC	6,000	28,500	32,340	6,000	5.39	32,340
ZC	7,000	28,000	31,710	8,000	4.53	36,240
		<u>56,500</u>	<u>64,050</u>			<u>68,580</u>
Manuf'd components						
YA	5,000	32,500	33,500	6,000	6.70	40,200
YB	6,000	12,000	14,100	6,000	2.35	14,100
ZA	7,000	28,000	29,050	8,000	4.15	33,200
ZB	6,000	12,000	14,100	8,000	2.35	18,800
		<u>84,500</u>	<u>90,750</u>			<u>106,300</u>
Assembly—Work in progress						
Model Y	200	2,816	3,104	200	15.52	3,104
Model Z	300	3,300	3,552	300	11.84	3,552
		<u>6,116</u>	<u>6,656</u>			<u>6,656</u>
Finished stocks						
Model Y	3,000	45,000	49,800	3,000	16.60	49,800
Model Z	4,000	48,000	50,600	4,000	12.65	50,600
		<u>93,000</u>	<u>100,400</u>			<u>100,400</u>
Totals		<u>288,116</u>	<u>313,856</u>			<u>340,936</u>

STATEMENT 3—*Summary of Stock Values*. This summary forms part of the hypothetical exercise. The stock valuation adjustment, which brings all opening stock values into line with the new standards, is £25,740 (£313,856 – £288,166). Sundry stores are omitted as they are not relevant to the exercise.

Lingrove Instruments Limited		PROFIT BUDGET	
Year ending 31 March 19--			
	£		£
Direct materials usage			1,685,540
Direct wages			870,750
Variable overhead			69,660
			<u>2,625,950</u>
+ Work in progress, commencing	6,656		
+ Stock of manuf'd components, commencing	<u>90,750</u>		<u>97,406</u>
			2,723,356
– Work in progress, ending	6,656		
– Stock of manuf'd components, ending	<u>106,300</u>		<u>112,956</u>
Variable cost of finished production			2,610,400
+ Stocks of finished products, commencing			100,400
			<u>2,710,800</u>
– Stocks of finished products, ending			<u>100,400</u>
Variable production cost of sales			2,610,400
+ Variable marketing cost			<u>225,940</u>
Variable cost of sales			2,836,340
Sales			4,108,000
Contribution			1,271,660
– <i>Fixed costs:</i>			
Production	513,600		
General administration	249,600		
Marketing	102,700		
Research & development	<u>31,200</u>		<u>897,100</u>
Operating profit (standard)			374,560
+ Stock valuation adjustment			<u>25,740</u>
Operating profit (adjusted)			400,300
+ Dividends receivable	10,000		
– Debenture interest payable	<u>16,300</u>	(–)	<u>6,300</u>
Net profit			<u>394,000</u>

STATEMENT 4 – *Profit Budget (Marginal Concept)*. This budget forms part of the hypothetical exercise. All commencing stocks are valued at new standard costs, the total amount of the adjustment being added back at the foot of the statement.

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The profit budget sums up the overall plan and, if senior management are not convinced that it depicts the best that can be devised in the circumstances, further revisions may still be made. In the end, however, a profit budget, broken down into control periods, emerges and is accepted.

Profit appropriation budget

This is supplementary to the profit budget and shows the anticipated liability for corporation tax and the planned distribution of the remainder of the budgeted net profit between dividends to shareholders and transfer to reserve. This relates to a year-end situation only and no purpose is served by preparing separate figures for control periods.

Budgeted balance sheet

The purpose of this is to give management a view of the balance sheet as it would appear at the end of the budget year provided the company's actual achievements had conformed with the plan.

2. BUDGET ADJUSTMENTS

Flexible budgets

Definitions. A *flexible budget* is one which, by recognising the difference in behaviour between fixed and variable costs in relation to fluctuations in output and turnover, is designed to change appropriately with such fluctuations. A *budget cost allowance* is the cost which a budget centre would be expected to incur in a control period having regard to the budget control bases which apply. This usually comprises variable costs in direct proportion to the volume of production or service achieved, and fixed costs as a proportion of the annual budget, having regard to the spread, throughout the year, of benefits expected to be derived from the expenditure, rather than to the dates of payment. (*Standard allowance* is a synonymous term.)

Purposes. Flexible budgeting procedure is only purposeful when it is intended to ascertain expenditure variances for *detailed items of expense* instead of merely the total overhead variance for a budget centre. The latter is ascertainable without flexible budgeting when the marginal principle applies. Refer to Statement 5 (page 80) and notice that standard variable overhead costs are automatically scaled to volume whereas the budgeted fixed costs remain unchanged, so that appropriate variances emerge.

Students often assume that flexible budgets *replace* original budgets, the latter being completely abandoned as obsolete. That this is a misconception is illustrated by Statement 5. There is no abandonment of the original budget and the operating profit variance of £3271 (adverse) represents the difference between the latter and the actual result. It is also clear from the statement that (i) the original budgeted profit is £31,205 and (ii) the budget profit, adjusted to actual sales volume, is £906 less, i.e. £30,299. Much thought and toil go into the original plan and if it is invalidated by changing conditions, management like to know the nature of the changes and the amount of gains or losses which they have caused. Refer also to the cost ledger illustrated on page 102 and note how, in the case of machining and assembly overhead (respectively) the variance is arrived at in the ledger account without any recourse to flexible budgeting.

However, whenever the overhead variance for a particular centre is significant, management will want it to be analysed under different items of expense, and it is then that the flexible budgeting procedure is useful. The alternative forms of procedure are now considered.

Multi-volume method. In this procedure standard aggregate overhead costs are set for each of a number of graduated levels of production or sales volume, the fixed costs being repeated unchanged in successive columns or 'stepped' at certain levels. 'Stepping' may apply where certain fixed costs are expected to change at certain volume levels within the adopted range. For example (supervision) —

<i>Production in standard hours</i>	£
Below 25,000	4700
Between 25,000 and 40,000	5000
Above 40,000	5300

The variable and semi-variable items are progressively scaled up in appropriate increments. When actual results are considered it is most unlikely that the production or sales level will coincide with any to which a set of standard costs has been related, and therefore it is necessary to select the nearest two levels and to arrive at the allowance by interpolation.

This method is rather cumbersome and only adopted where the fixed costs have been subjected to severe 'stepping'.

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Formula method. For each budget centre in which there are both fixed and variable overhead a formula is prepared. The separate items of expenditure are listed and against each is shown the budgeted overhead for a period in which volume is normal. Analytical columns show (i) fixed overhead, (ii) variable overhead and (iii) variable overhead per unit. The application of the formula in connection with variance analysis is illustrated on page 93.

Continuous budgeting

The unstable environment. These pages were written during a period of world-wide economic difficulty. Leaving aside mere fluctuations in production and sales volume, to which the previous section refers, budgets require regular review and modifications to reflect rapidly changing conditions in the business environment. Severe increases in costs cannot be ignored and methods of manufacture and distribution, product mix and pricing policy are frequently reconsidered. The *liquidity* position is of paramount importance, in many cases of greater importance than immediate profitability, and must be kept under continuous surveillance. In such circumstances six to twelve months is too long a period for accurate detailed predictions to be made although the need to assess probable trends and plan beyond that time span on a broad scale is imperative.

Shorter cycle. Assuming that a quarterly cycle is considered appropriate for detailed budgeting, a time scale such as the following may be set up —

<i>Month of preparation</i>	<i>Months to which fully-detailed budgets would relate</i>	<i>Periods to which broadly-based budgets would relate</i>
February	April, May and June	Remainder of year
May	July, August and September	Remainder of year
August	October, November and December	Remainder of year
November	January, February and March	Following year

Pro and con. Budget work undertaken quarterly instead of annually makes greater demands on the time of executives and clerical assistants.

On the other hand, throughout the year, the budgets are more akin to current conditions so that variances are more realistic and control more effective. Lessons may be learned, not only from a study of variances between the revised budget and actual, but also from comparisons between the original and revised budgets.

Isolated revisions of standard costs

In times of reasonable stability when the need for continuous budgeting as described in the previous section does not arise it may be necessary to revise one or more standard costs during the budget year. Trivial alterations are avoided but in a situation where one or more standard product costs are no longer realistic because of a significant change in the price of an important raw material, it may be decided to bring them up-to-date without revising the budget. This gives rise to a revision variance in each control period following the adjustment for the remainder of the budget year. The difference between the original and the revised standard cost is multiplied by the *budgeted quantity* for the period. The variance is required in order that the difference between budgeted and actual profit may be fully accounted for.

PART THREE

Accounting for Variances

CHAPTER 6

Theory and Practice of Variance Analysis

1. THEORETICAL ASPECTS

Significance

It is hoped that this chapter will be helpful to students in that a theoretical approach is often appropriate when answering examination questions where the shortest route to the required conclusion must be taken without regard to practical routine procedures. The ways in which practice usually differs from theory are considered in Section 2 of this chapter.

Figure 4 illustrates variance analysis related to the marginal costing concept. It differs from the figure in the *ICMA Terminology* (1974) because the latter is composite, referring to both marginal and absorption concepts.

Profit budget

Statement 4 page 67 illustrates the profit budget of Lingrove Instruments Limited for the budget year. The following is the profit budget, in abbreviated form, for the month of June.

*Note: as purely financial transactions, such as dividends received or debenture interest payable, arise yearly or half-yearly, it is usual to exclude such items from monthly statements, and focus attention on the operating profit variance and its component parts.

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	<i>Model Y</i>	<i>Model Z</i>	<i>Total</i>
<i>Sales:</i>	£	£	£
6500 x £26.00	169,000		
8500 x £20.00		170,000	339,000
<i>Variable cost of sales:</i>			
6500 x £18.03	117,195		
8500 x £13.75		116,875	234,070
<i>Contribution:</i>	<hr/>	<hr/>	<hr/>
6500 x £7.97	51,805		
8500 x £6.25		53,125	104,930
	<hr/> <hr/>	<hr/> <hr/>	
less <i>Fixed costs:</i>			
Production:		£	
Machining		13,200	
Assembly		3,800	
Service		7,500	
Production, general		17,575	
		<hr/>	
		42,075	
General administration		20,600	
Marketing		8,475	
Research & development		2,575	
		<hr/>	
			73,725
			<hr/>
			31,205
			<hr/>

Primary analysis

(a) *In general.* In practice, the actual operating profit is not known until all variances have been determined. However, from the data presented in theoretical exercises it is often possible to arrive at the operating profit variance initially in order to establish it as a control figure, then to analyse downwards following a pattern such as that depicted by Figure 4 (page 77). Alternatively, a primary analysis may be effected in a preliminary exercise as illustrated by Statement 5 (page 80). In either case the establishment of the operating profit variance as a control figure provides an automatic check, thus ensuring that the sum of the parts is equal to the whole. The variances determined primarily are detailed below. The *plus* sign indicates that the variance is favourable whilst the *minus* sign means adverse.

(b) *Operating profit variance (-£3271).* This is the difference between budgeted and actual operating profit related to a specific period.

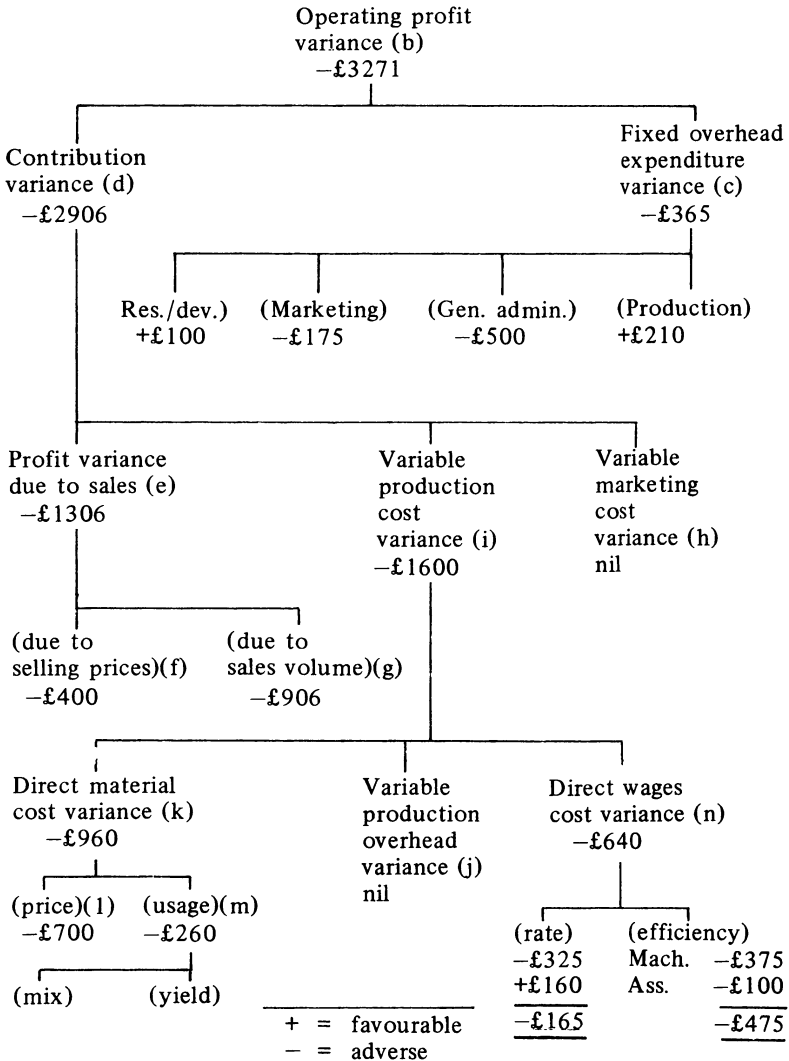


FIGURE 4 – Interrelationships of Variances (Marginal Concept)

The above analytical pattern is theoretical and is intended to indicate general principles. In any specific organisation variances would be more numerous and many would have special relevance to the characteristics of the particular business. The figure relates to the hypothetical *Lingrove Instruments* exercise. The letters in brackets which follow the titles of the variances cross-refer to the explanations under 'Primary analysis', commencing on page 76.

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(c) *Fixed overhead expenditure variance (-£365)*. This is the difference between budgeted and actual fixed overhead. Separate figures are prepared for production (+£210), general administration (-£500), marketing (-£175), and research and development (+£100). Each such item is subject to further analysis as required; *production* into machining, assembly, service and production general; *marketing* into warehousing, packing for despatch, despatching and carriage; *general administration* into general management, secretarial, accounting and general office; and *research and development* into its two components. Further analysis may cover budget centres within broad functional divisions and the different types of expense. In practice it is often found more satisfactory to determine overhead expenditure variances for fixed and variable overhead combined. (See 'Validity of Variable overhead Variances' on page 91 and also analytical formula 1 on page 83).

(d) *Contribution variance (-£2906)*. This is the difference between budgeted and actual contribution (See analytical formula 1).

(e) *Operating profit variance due to sales (-£1306)*. This is the difference between (i) the budgeted contribution and (ii) the margin between the actual sales and the standard variable cost of those sales. It is the sum of the two variances which follow. (See analytical formula 2 on page 84.)

(f) *Operating profit variance due to selling prices (-£400)*. This is the difference between the standard and actual prices of the sales effected. If desired it may be analysed by products. (See analytical formula 2).

(g) *Operating profit variance due to sales volume (-£906)*. This is the difference between budgeted and actual sales quantities, both being valued at standard unit contribution margins. (See analytical formula 2).

(h) *Variable marketing cost variance (nil)*. In practice it is often found more satisfactory to determine overhead expenditure variances for fixed and variable overhead combined (see 'Validity of Variable overhead Variances', page 91) and this concept is maintained in the illustrations presented in Section 2 of this chapter and also in Chapter 7. To avoid confliction with the illustrations contained in this section the variable marketing cost variance is taken as nil. The variance, if it is

accepted as valid, is the difference between the standard and actual variable marketing costs of the products actually sold.

(i) *Variable production cost variance (-£1600)*. This is the difference between the standard variable cost of the production achieved, whether completed or not, and the actual variable cost incurred on such work. Details of further analyses follow. (See analytical formula 2 on page 84.)

(j) *Variable production overhead variance (nil)*. The reason why the amount of this variance is assumed to be nil for purposes of the exercise is explained in Subsection (h). This variance is the difference between the standard variable production overhead absorbed in the production achieved, whether completed or not, and the actual variable production overhead. Factors other than the volume of physical output may influence the amount of variable production overhead, e.g. the number of persons employed, the number of direct labour hours worked or the number of machine hours. It is not, however, usually practicable to identify and measure these influences with sufficient precision to merit their acceptance as a basis for further analysing this variance into sub-variances of expenditure and efficiency.

(k) *Direct materials cost variance (-£960)*. The amount of this variance in any period depends on the manner in which the price variance is determined. In theory, the price variance may be isolated during the process of analysing production cost variances, the materials being charged to production at actual prices. In practice, however, the procedure universally adopted is to isolate the price variance at the point of purchase and to charge materials to production at standard prices. This saves considerable clerical work, particularly in connection with the stores records as the money values of individual transactions are dispensed with and only the quantities entered. Another advantage of this procedure is that the price variance is determined earlier. In such circumstances the direct material cost variance is the sum of the price and usage variances.

(l) *Direct materials price variance (-£700)*. This is the difference between the standard price and the actual price paid for direct materials purchased during the period. In Statement 5 (page 80), the price variance of £700 is carried into the 'actuals' and 'variances' columns so that the operating profit variance can be arrived at as a single figure.

MACHINING	AT STANDARD												ACTUALS	PRIMARY VARIANCES + fav. -adv.
	Component YA		Component YB		Component ZA		Component ZB		TOTAL		£			
	£	per unit	£	per unit	£	per unit	£	per unit	£	per unit				
	6600	8500	6500	8300	50,200	14,800	45,625	3,650	700	50,500		14,760		
Units produced	4.00	26,400	1.00	6,500	2.80	23,800	1.00	8,300	1.25	10,375	0.10	830	700	- 700
Price variance Material A	2.50	16,500	1.25	8,125	1.25	10,625	1.25	10,375	0.10	850	0.10	830	50,500	- 300
Material B	0.20	1,320	0.10	650	4.15	35,275	2.35	19,505	4.15	35,275	2.35	19,505	14,800	+ 40
Direct wages	6.70	44,220	2.35	15,275	4.15	35,275	2.35	19,505	4.15	35,275	2.35	19,505	45,625	- 700
Variable overhead													3,650	-
TRANSFERRED TO COMPONENT STORE													114,275	-1660
													115,935	-1660

ASSEMBLY	AT STANDARD												ACTUALS	PRIMARY VARIANCES
	MODEL Y		MODEL Z		TOTAL		£							
	Units	£ per unit	Units	£ per unit	Units	£ per unit								
	6600	16.60	109,560	8200	12.65	103,730								
Variances bro./fwd													1,660	-1660
Own components													113,030	-
Bought components													72,720	-
Direct wages													25,500	+ 60
Variable production overhead													2,040	-
TRANSFERRED TO FINISHED STOCK													214,890	-1660

COST OF SALES AND PROFIT													
Variations bro./fwd	6700	16.60	111,220	8100	12.65	102,465				1,600	-1600		
Ex finished stock		1.43	9,581		1.10	8,910				213,685	-		
Variable marketing cost										18,491	-		
Total variable cost of sales	6700	18.03	120,801	8100	13.75	111,375				233,776	-1600		
Actual sales	6700	26.00	174,200	8100	20.00	162,000				335,800	-400		
CONTRIBUTION on actual sales	6700	7.97	53,399	8100	6.25	50,625				102,024	-2000		
Sales quantity difference	-200	7.97	-1,594	+400	6.25	+ 2,500					-906		
CONTRIBUTION (budgeted/actual)	6500	7.97	51,805	8500	6.25	53,125				102,024	-2906		
		Less FIXED COSTS:											
		Production											
		General administration											
		Marketing											
		Research and development											
OPERATING PROFIT (Budgeted/actual)		31,205											
		42,075											
		20,600											
		8,475											
		2,575											
		31,205											
		41,865											
		21,100											
		8,650											
		2,475											
		27,934											
		+ 210											
		- 500											
		- 175											
		+ 100											
		-3271											

STATEMENT 5 – Primary Variance Analysis (Marginal Concept) (Lingrove Instruments Limited – June 19 –)

This exercise determines the operating profit variance and its major component parts when the marginal principle applies.

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(m) *Direct materials usage variance (-£260)*. This is the difference between the standard quantity specified for the production achieved, whether completed or not, and the actual quantity used, both valued at standard prices. Details are Material A (-£300), Material B (+£40), as shown on Statement 5. In types of production in which direct materials are physically mixed the cost is affected by the proportions of the different ingredients as well as by the *input to output* ratio, influences which are measured by mix and yield variances respectively. The split of the usage variance into these two sub-variances is not shown by the primary analysis and is effected by a supplementary exercise. (See item 'a', supplementary analysis, below.)

(n) *Direct wages cost variance (-£640)*. This is the difference between the standard direct wages specified for the production achieved, whether completed or not, and the actual direct wages incurred. Statement 5 shows £700 adverse for machining and £60 favourable for assembly. Each of these figures may be further analysed as to rate and efficiency by means of a supplementary exercise. (See item 'b' below.)

Supplementary analysis

(a) *Direct materials mix and yield variances*. The *mix* variance is the difference between the actual quantities of ingredients used in a mixture at standard price, and the total quantity of ingredients used at the weighted average price per unit of ingredients as shown by the standard cost sheet. The *yield* variance is the difference between the standard cost of the production achieved, whether completed or not, and the cost of that production, arrived at by multiplying the actual total quantity of ingredients used by the weighted average price per unit as shown by the standard cost sheet. The mix and yield variances only apply when direct materials are physically mixed and so do not occur in light engineering as exemplified by the Lingrove company. The ascertainment of these variances is illustrated in analytical formula 3 on page 84.

(b) *Direct wages rate and efficiency variances*. The *rate* variance is the difference between the standard rates of pay specified and the actual rates paid. The direct labour *efficiency* variance is the difference between the standard direct wages cost for the production achieved, whether completed or not, and the actual hours at standard rates (plus incentive bonus, if any). In calculating the variances it is usual to

express production achieved in terms of *standard hours* (page 48), this being a convenient common denominator where there is more than one product and no other unit of measurement can be commonly applied. Analytical formulae 4 (page 85) and 5 (page 86) illustrate the segregation of these variances. Formula 5 shows the analysis where *productivity bonus* is paid.

(c) *Fixed production overhead variance (+£210)*. Lingrove subdivide this in relation to the four separate budget centres within the production function, thus —

	<i>Budget</i> £	<i>Actual</i> £	<i>Variance</i> £	
Machining	13,200	12,800	400	<i>fav.</i>
Assembly	3,800	4,100	300	<i>adv.</i>
Service	7,500	6,800	700	<i>fav.</i>
Prod'n General	<u>17,575</u>	<u>18,165</u>	<u>590</u>	<i>adv.</i>
	<u>42,075</u>	<u>41,865</u>	<u>210</u>	<i>fav.</i>

Each of the above sub-variances can be further analysed as to types of expense if required. (See 'Detailed analysis', page 93.)

Analytical formulae

Formula 1. The Lingrove operating profit variance is broken down into *contribution* and *fixed overhead* variances.

	£		
Actual contribution	102,024		
less			
Actual fixed costs	74,090		
= Actual optg profit	<u>27,934</u>		
Budgeted contribution	104,930	↑ contribution variance £2906 <i>adv.</i>	↑ Operating profit variance £3271 <i>adv.</i>
less			
Actual fixed costs	74,090		
	<u>30,840</u>		
Budgeted contribution	104,930	↑ fixed overhead variance £365 <i>adv.</i>	
less			
Budgeted fixed costs	73,725		
= Budgeted optg profit	<u>31,205</u>		

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Formula 2. The Lingrove contribution variance is broken down into *variable production cost variance* and *profit variance due to sales* and the latter is analysed as to causes, i.e. *selling price* and *sales volume*.

Actual sales	335,800			
<i>less</i>				
Actual variable cost of sales	<u>233,776</u>			
= Actual contribution	<u>102,024</u>			
Actual sales	335,800			
<i>less</i>				
Standard variable cost of sales	<u>232,176</u>			
	<u>103,624</u>			
Actual sales at standard prices	336,200	due to selling prices		
<i>less</i>		£400 <i>adv.</i>		
Standard variable cost of sales	<u>232,176</u>			
	<u>104,024</u>			
Budgeted sales*	339,000	due to sales volume		
<i>less</i>		£906 <i>adv.</i>		
Budgeted variable cost of sales*	<u>234,070</u>			
= Budgeted contribution	<u>104,930</u>			

Variable production cost variance
£1600 *adv.*

Contrib'n variance
£2906 *adv.*

Profit variance due to sales
£1306 *adv.*

*See 'Profit budget', page 76.

Formula 3. Direct materials *mix* and *yield* variances are explained on page 82. This is the standard formula (or cost sheet) for chemical product ML –

<i>Ingredient</i>	<i>Kgs.</i>	<i>Price</i>	£	
D	20	1.25	25	
E	30	1.00	30	
F	<u>50</u>	<u>0.70</u>	<u>35</u>	
	100	0.90*	90	
Process loss	<u>10</u>	–	–	* weighted average price of ingredients
Output	<u>90</u>	<u>1.00</u>	<u>90</u>	

The material usage variance is now broken down into *mix* and *yield* variances.

Actual quantities at standard prices:

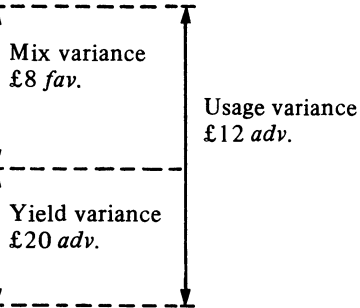
	kgs.	£
D	180	225
E	310	310
F	510	357
	<u>1000</u>	<u>892</u>

Total quantity used at standard weighted average price

1000 kgs. @ £0.90 = 900 £

Standard cost of production achieved

880 kgs. @ £1.00 = 880 £



Formula 4. The basis of wages in the Lingrove company is the flat hourly rate. The direct wages variance is broken down into *rate* and *efficiency* variances. As the number of standard hours produced is a factor in the analysis formula let us see how the standard hours in machining and assembly are arrived at.

Machining

Component	Std hrs
YA 6600 x 2 =	13,200
YB 6500 x 1 =	6,500
ZA 8500 x 1 =	8,500
ZB 8300 x 1 =	8,300
	<u>36,500</u>

Assembly

Model	Std hrs
Y 6600 x 2 =	13,200
Z 8200 x 1½ =	12,300
	<u>25,500</u>

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The analysis formula follows:

	<i>Machining</i> £	<i>Assembly</i> £
(i) Actual direct wages incurred	46,325	25,440
(ii) Actual hours at standard rates 36,800 x £1.25 25,600 x £1.00	46,000	25,600
(iii) Standard hours produced at standard rates 36,500 x £1.25 25,500 x £1.00	45,625	25,500
Rate variances (i) – (ii)	325 <i>adv.</i>	160 <i>fav.</i>
Efficiency variances (ii) – (iii)	375 <i>adv.</i>	100 <i>fav.</i>
Direct wages variances (i) – (iii)	700 <i>adv.</i>	60 <i>fav.</i>

Note: The need for this exercise may be obviated by measures described under 'Direct wages variances', page 89.

Formula 5. The situation here considered is where a bonus is paid for the attainment of a certain level of efficiency. As this is outside the Lin-grove exercise a new set of data must be assumed.

Assumed data:

Standard minutes value: 10 minutes (i.e. 6 units per standard hour)
 Bonus for achieving standard performance: 20 per cent on flat rate
 (Separately assessed for each individual)
 Standard hourly rate: £1.20

	£	= per std hr £
Standard direct wages cost per unit (based on standard performance):		
10 mins. @ £1.20 per hour =	0.20	1.20
plus bonus 20%	<u>0.04</u>	<u>0.24</u>
	<u>0.24</u>	<u>1.44</u>

Actual data for September:

Actual production: 12,000 units (= 2000 standard hours)
 Actual hours worked: 2200
 Wages paid: Flat rate £2500, bonus £360, total £2860
 Situation: Because of shortage of grade A operatives some of the work was done by trainees rated at £1.00 per hour. The trainees failed to qualify for bonus

The analysis formula follows.

Actual wages (including bonus earned)	£2860			
Actual hours at standard hourly rate (plus actual bonus)	£			
2200 x £1.20 =	2640			
Bonus	360			
	£3000			
Production at standard cost				
2000 x £1.44 =	£2880			

	Rate variance £140 fav.	
	Efficiency variance £120 adv. (see below)	

Direct wages variance
£20 fav.

The efficiency variance may merit some elucidation. Ignore the lower hourly rate paid to the trainees as this is already accounted for. If the 12,000 units had been produced in 200 hours (i.e. standard performance) the cost would have been –

	£
Flat rate (£1.20 per hour)	= 2400
Bonus 20%	480
	2880

The work took an extra 200 hours which, at standard hourly rate, is equivalent to £ 240 adv.

but against this there must be offset the reduction in bonus payable £(480-360) 120 fav.

so the net difference arising from efficiency is 120 adv.

2. VARIANCE ANALYSIS IN PRACTICE

Adaptation of theory

Because manufacturing industry comprises an enormous variety of products and methods of production it is impossible to describe in a single volume every variance accounting system which can be operated. There is an assemblage of basic theory embodied in courses of instruction and which, in varying degrees, forms bases of systems in use. However, the student who takes all theory for granted and sees it as universally applicable will experience difficulty and disenchantment when challenged by practical responsibilities. Academic theory, however ingenious and however traditional, must be questioned and always seen to be logical in its practical applications.

Brentwood Chemicals Limited

Product HT

STANDARD COST OF ONE BATCH OF 1000 KG INPUT									
PROCESS 1	Kgs.	Materials		Wages		Overhead		Total	
		per kg	£	per kg	£	per kg	£	per kg	£
Direct materials	1000	1.35	1350						1350
Direct wages				0.36	360				360
Variable overhead						0.135	135		135
– Process loss (10%)	1000 100	1.35	1350	0.36	360	0.135	135	1.845	1845
Output – to Process 2	900	1.50	1350	0.40	360	0.15	135	2.05	1845

PRODUCT:- HT COST SHEET June 19-									
PROCESS 1	Kgs.	Materials		Wages		Overhead		Total	
		per kg	£	per kg	£	per kg	£	per kg	£
Materials @ std price	4000	1.35	5400						5400
Wages @ std rate					1390				1390
Variable overhead @ std cost							525		525
‡ Labour efficiency variance					+ 50				50
Standard input cost	4000	1.35	5400	0.36	1440	0.13	525	1.84	7365
Actual process loss (12½%)	500								
‡ Process loss variance			–150		– 40				–190
Standard output cost	3500	1.50	5250	0.40	1400	0.15	525	2.05	7175
+ Work in progress commencing	880	1.50	1320	0.40	352	0.15	132	2.05	1804
	4380	1.50	6570	0.40	1752	0.15	657	2.05	8979
–Work in progress ending	400	1.50	600	0.40	160	0.15	60	2.05	820
Output – to process 2	3980	1.50	5970	0.40	1592	0.15	597	2.05	8159

STATEMENT 6 *Variations Ascertained in Relation to Individual Products.*

This shows a part of a standard cost sheet and a part of a monthly cost sheet on which variances are ascertained for the individual product.

Direct wages variances

In the same way as direct materials are charged to production at standard prices, direct wages may be charged at standard hourly rates. Direct labour hours as well as wages are recorded in the wages analysis. The hours are extended at standard rates and the difference between actual and standard wages is identified as the *rate* variance and transferred to the prime cost variances account. When this procedure is adopted, the direct wages variance arising at the next stage of analysis is attributed wholly to *efficiency*.

Intermediate stocks and work in progress

These are valued at standard cost. Where the product passes through a long sequence of processes and the movement is slow there will always be large quantities of work in progress. It is usual to limit the number of recognised inventory stages to those where the build-up is particularly heavy and the standard cost sheets are so arranged that accumulated costs to these stages are shown and are available for the purposes of valuation. In many cases, however, it is possible to avoid unnecessary figure work by ignoring unimportant accumulations at intermediate stages. Assume that eleven batches of 600 units each, serially numbered 131 to 141 inclusive, have been fully processed during the month of June, that batch number 142 was commenced on 30 June and that the position at the end of the day was that 500 units were complete as to process 1 and 100 as to process 2. The convention is adopted that batches not completely processed in the month are treated as if commenced on the first day of the following month.

The raw material issued for batch 142 is treated as issued on 1 July and the processing wages incurred on the batch, taken at standard, are carried forward to July in the direct wages account. An appropriate amount for overhead is also carried forward. The financial effect is exactly the same as if the work in progress was recorded as such and valued at standard, the only difference being that the values are shown in different sections of the inventory. The costing work, however, is simplified by eliminating unnecessary elaboration.

Analytical procedures

Method 1. Statement 5 (page 80) illustrates a method of variance analysis suitable for answering a certain type of examination question. It can also be used as a suitable practical application in those rare cases where product variety is limited to, say, five items or less.

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Method 2. In multi-product situations it is not convenient to assemble the product costs in columnar form and so a slightly different method of aggregating the figures is called for. The standard costs of actual production are computed on separate sheets, one sheet per product, and the figures are added through to a summary sheet and are then available for comparison with actuals. By this procedure variances are related to cost centres but not to individual products. All postings to work in progress are at standard, the variances arising in other ledger accounts.

Example

Direct raw material			
	£		£
Raw materials store control (act. usage @ std price)	65,260	Work in progress (std usage @ std price)	65,000
		Prime cost variances (direct material usage)	260
	<u>65,260</u>		<u>65,260</u>

Method 3. Because of peculiar characteristics there are situations where different products do not respond uniformly to processing. For example, loss of organic matter and other forms of wastage may be difficult to control and, if excessive, may seriously affect profitability. A large loss may be attributable to one or two products only out of a wide range, and where this is the case variances should be related to individual products. Such conditions require day-to-day control, whereby exceptional results on individual batches are promptly reported to the executive concerned (see 'Interim quantitative reporting', page 19). Nevertheless, the statistical data must be implemented by information in monetary terms, even though the latter may follow some weeks later. The following hypothetical situation exemplifies the point.

At the monthly production meeting, chaired by the production manager, attention is directed to an adverse process loss variance of £300 on product M. Because of the statistical control in operation, the executive concerned is able to assure the chairman that the facts were brought to light and investigated three weeks previously and appropriate action promptly taken.

In order to identify variances with individual products it is necessary to use a suitable printed form of cost sheet as illustrated by State-

ment 6 (page 88). The hypothetical company envisaged for this example is engaged in the manufacture of chemical products, process loss being a feature of this type of production. A separate cost sheet is used each month for each product. The set of sheets for a particular month forms the work in progress ledger for that month. When the month's costing is complete, the work in progress quantities and standard values (ending) are transferred to new sheets as opening work in progress for the following month. Actual quantities of direct materials are debited to individual products at standard prices and actual direct labour hours are debited at standard rates. Variances arising in the course of manufacture are arrived at on these sheets.

At each stage where the unit cost reflects a deviation from standard, a value is added (debited) or subtracted (credited) in order to convert the cost to standard, so that the output of each process is valued at standard cost. *This is why actual product costs are not ascertained in such systems.* Statement 6 shows the manner in which *process loss* variance is arrived at. In this situation actual loss was 12½ per cent compared with the standard of 10 per cent. It will be seen that the adverse variance of £190 comprises both material and wages. The ascertainment of overhead variances requires special consideration, which is the subject of the following subsection.

Overhead variances

Validity of variable overhead variances. The difficulty of segregating *budgeted* overhead into variable and fixed categories is referred to on page 8. Despite the element of uncertainty in the resultant figures the exercise is necessary, otherwise it would not be possible to establish standard marginal costs and contribution margins for products (Statement 2, page 51) or to fix budget cost allowances (page 68) as standards against which actual overhead is measured. Having dealt with the problem by using the best means available, the accountant is confronted by another, and even more difficult problem, which is the apportionment of *actual* overhead into fixed and variable components. For example, the budgeted cost allowance for repairs and maintenance in a centre is £1000 (£820 fixed and £180 variable) and the actual cost for the period is £1250. How should the latter amount be apportioned between fixed and variable? A pro-rata apportionment would merely be an arbitrary assessment of the proportion of the excess cost attributable to each of the two elements. No doubt some accountants do apportion actual overhead and show the variances on variable overhead, albeit not

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without some feeling of unease because it is impossible to decide, at the time of reporting, whether a particular deviation relates to the fixed category or the variable.

Variable overhead variances frequently feature in examination questions and precision of measurement is taken for granted, sometimes to the extent that it is implied that not only can a valid variable overhead variance be calculated, but it is possible to determine how much is due to efficiency and how much to expenditure. Such precision of measurement is not possible in real situations. Reverting to the above example, the variance on fixed repairs and maintenance could be stated as £205 and on the variable cost as £45. This however would be quite arbitrary. The proper course would be merely to report a repairs and maintenance cost variance of £250.

Ascertainment of overhead variances. In practice, many unnecessary complications are avoided by absorbing variable overhead (and also fixed if the absorption concept applies) in accordance with established standard costs so that no overhead variances arise on the cost sheets. This is exemplified in Statement 6, page 88. Note particularly that the variable overhead is absorbed at the standard cost *per unit of output* (or *per standard hour produced*, which amounts to the same thing). The variances arise in the ledger accounts as exemplified below –

Overhead (Process 1)			
	£		£
Overhead suspense, (actual expenditure)	3100	Work in progress, (absorption, variable)	525
Overhead variances	150	Costing P.&L. (fixed overhead as budgeted)	2725
	3250		3250

Further examples of the above procedure are to be found in the cost ledger exercise commencing on page 100.

Detailed analysis. Where the overhead variance for a specific budget centre demands detailed analysis into items of expense, budget cost allowances are worked out and set against actual costs. The detailed analysis for Lingrove’s machining budget centre for the month of June appears on the following page.

Item	Monthly fixed cost	Variable cost		Overh'd cost allowance	Actual cost	Variance + excess – saving
		pence per std/hr	Amount			
Supervision	£ 4,900	-	£ -	£ 4,900	£ 4,400	– 500
General labourers	2,170	2	730	2,900	3,200	+ 300
Other indirect labour	-					
labour	1,435	1	365	1,800	1,650	– 150
Power	140	4	1,460	1,600	1,500	– 100
Consumables	-	2	730	730	960	+ 230
Repairs & maint.	2,035	1	365	2,400	2,240	– 160
Miscellaneous	2,520	-	-	2,520	2,500	– 20
	13,200	10	3,650	16,850	16,450	– 400

3. REPORTING VARIANCES

Interim statistics

Deviations from planned performance must be reported to those responsible for corrective action with the minimum delay. In many mass-production plants such deviations are reported in quantitative terms within a few hours after occurrence. For typical procedure see 'interim quantitative reporting', page 19.

Departmental operating statements

Weekly statements. Where a procedure of interim quantitative reporting is in operation it is often found an advantage to hold a weekly meeting of production supervisors at which the summarised results of the previous week's work, set out in statement form, are discussed. In this way the production manager, as chairman, is kept closely in touch with affairs for which he is responsible and is enabled to judge the effectiveness with which his subordinates are dealing with day-to-day problems.

Monthly or four-weekly statements. Some statistical data such as production volume, utilisation of capacity and labour productivity, which are reported weekly, are also presented for a month or four-week control period. Additionally, information in monetary terms is also available from the variance accounting system.

The production manager and managers of the machining and assembly departments of Lingrove Instruments Limited each receive a monthly departmental operating statement. An example, for machining, is Statement 7, page 95. Note the introduction of a classification of

overhead variances into *authorised* and *unauthorised* categories, explained in the subsection immediately following.

Authorised and unauthorised variances. In principle an executive should not be held responsible for deviations from plan over which he cannot exercise control. Attempts are therefore often made to segregate variances into controllable and uncontrollable categories. In some cases those variances which are deemed to be uncontrollable are omitted from departmental operating statements. In this connection the difference between theory and practice is quite marked. A dilemma arises from costs which are *partly* controllable, and there are cases where excessive costs arise from causes which cannot be identified until the circumstances have been investigated after the event. In drafting the definition of the term *controllable cost* for the *ICMA Terminology* (1974) the author added: 'it is not always possible to predetermine responsibility because the reason for deviation from expected performance may only become evident from subsequent investigation. For example, excessive scrap may arise from inadequate supervision or from some latent defect in purchased material.' In practice, variance statements usually present a mixture of controllable, partly controllable and uncontrollable variances, these are all carefully scrutinised and discussed. No reasonable manager criticises a subordinate for events beyond the latter's control.

Notice how the Lingrove organisation deals with certain items of departmental overhead affected by decisions made above departmental level or by extraneous influences such as an increase in the price of electricity; Statement 7 (page 95) refers. The allowances are adjusted for authorised variances. The departmental manager is called upon to offer explanations (without necessarily implying that he is at fault) of unauthorised variances.

Reporting to functional management

Functional heads such as the marketing and production managers receive copies of all statements submitted to their immediate subordinates. In addition, statements in summary form are specially prepared

To: Manager, Machining (copy to Production Manager)
 From: Management Accountant

Date:

DEPARTMENTAL OPERATING STATEMENT

Machining

June 19 –

	Grinding	Turning	Drilling	Total Machining
Budgeted std hours (a)	8600	15,450	12,450	36,500
Std hours produced (b)	8610	15,450	12,440	36,500
Actual direct hours (c)	8690	15,574	12,536	36,800

RATIOS:

	%	%	%	%
Production volume b/a	100.1	100.0	99.9	100.0
Capacity c/a	101.0	100.8	100.7	100.8
Productivity b/c	99.1	99.2	99.2	99.2

COST VARIANCES

Summary	Standard £	Actual £	Variance £
Direct material	65,000	65,260	+ 260
Direct wages	45,625	46,325	+ 700
Overhead	16,850	16,450	- 400
	<u>127,475</u>	<u>128,035</u>	<u>+ 560</u>

Details	Standard £	Actual usage at standard prices £	Usage variance £
<i>Direct materials:</i>			
A	50,200	50,500	+ 300
B	14,800	14,760	- 40
	<u>65,000</u>	<u>65,260</u>	<u>+ 260</u>

<i>Direct wages:</i>	Standard £	Actual £	Variances	
			rate £	efficiency £
Grinding	10,763	10,943	+ 80	+ 100
Turning	19,312	19,607	+140	+ 155
Drilling	15,550	15,775	+105	+ 120
	<u>45,625</u>	<u>46,325</u>	<u>+325</u>	<u>+ 375</u>

<i>Overhead</i>	Original allowance £	Authorised variance £	Adjusted allowance £	Actual cost £	Unauthorised variance £
Supervision	4,900	- 500	4,400	4,400	-
General labourers	2,900	+150	3,050	3,200	+150
Other indirect labour	1,800	- 100	1,700	1,650	- 50
Power	1,600	+100	1,700	1,500	- 200
Consumables	730	-	730	960	+230
Repairs and maintenance	2,400	+ 100	2,500	2,240	- 260
Miscellaneous	2,520	-	2,520	2,500	- 20
	<u>16,850</u>	<u>- 250</u>	<u>16,600</u>	<u>16,450</u>	<u>- 150</u>
Overspending + Saving -					

for them, to which their attention is primarily directed; they need only refer to the detailed copies when amplification of some particular matter is required.

Reporting to top management

Form of statement. Statement 8 (page 97) illustrates the information presented to the managing director of the Lingrove company. Additionally he is provided with copies of the summary statements prepared for the functional managers. Observe that Statement 8 is not restricted to variances, certain significant ratios also being shown. These are explained in the subsections which follow.

Return on capital employed ratio is the relationship between the profit earned (usually before tax) and the capital employed in earning that profit. It is normally expressed as a percentage, which measures the efficiency with which the capital is employed. The term *primary ratio* is often used as an alternative. Capital employed by the Lingrove company is assumed to amount to £1,200,000.

Profit to sales ratio is the percentage which profit (before tax) bears to the value of sales.

Sales to capital employed ratio is the value of sales obtained for every £1 of capital employed. The ratio for the month is multiplied by twelve to give the annual equivalent, which may be regarded as the number of times the capital is turned over in the year. Notice that

$$\begin{aligned} \text{Sales to capital employed ratio} \times \text{Profit to sales ratio} \\ = \text{Return on capital employed ratio} \end{aligned}$$

Actual to budgeted sales ratio is the amount of actual sales expressed as a percentage of budgeted sales.

Lingrove Instruments Limited		
PROFIT STATEMENT		
<i>June 19 –</i>		
RATIOS	Budgeted	Actual
Return on capital employed, June = per annum	2.60% 31.2%	2.33% 28.0%
Profit to sales . . .	9.21%	8.32%
Sales per £1 of capital employed, June = per annum	£0.2825 £3.39	£0.2798 £3.36
Sales . . .	£339,000	£335,800 (99%)
BUDGETED OPERATING PROFIT		£ 31,205
<i>Marketing variance:</i>		£
Selling prices	– 400	
Sales volume	– 906	
	<u>– 1306</u>	
Marketing expenditure	– <u>175</u>	– 1481
<i>Production variance:</i>		
Prime cost	– 1600	
Overhead	+ <u>210</u>	– 1390
<i>General administration expenditure variance:</i>		
General management	+ 50	
Secretarial	+ 100	
Accounting	– 250	
General office	– <u>400</u>	– 500
<i>Research and development expenditure variance:</i>		
	+ 100	– <u>3,271</u>
ACTUAL OPERATING PROFIT		<u>27,934</u>

STATEMENT 8 Monthly Profit Statement. This exemplifies monthly information submitted to top management. Appended would be copies of the statements presented to the functional managers.

CHAPTER 7

Cost and Financial Accounts – The Link

1. ALTERNATIVES

Alternative arrangements are available; interlocking and integral accounts.

2. INTERLOCKING ACCOUNTS

Explanation. The cost accounts are distinct from the financial accounts, the two sets of accounts being kept continuously in agreement or readily reconcilable. Items of income and expenditure of a purely financial nature, such as dividends receivable and debenture interest payable, are usually dealt with in the financial accounts only, but otherwise the basic data appear in both sets of accounts. Interlocking accounts are preferred by many companies having complex production patterns and wide product ranges, as they accommodate a measure of specialisation in the accounting procedures.

Interlock. Many students mistakenly think that the interlocking concept requires tedious and time consuming reconciliation exercises. On the contrary, nothing could be simpler than to keep the two sets of accounts continuously in agreement. All that is necessary is to establish systematic liaison between the two accounting sections. An effective routine is for a serially numbered proforma debit or credit slip to pass from the financial to the costing side for each item of cost or revenue to be taken up in the cost accounts. Items such as sales, purchases, rates and insurances originate in the financial accounts, whilst others such as

overhead absorption, values of closing stocks and transfers to overhead of losses such as stores deficiencies, are initiated in the cost accounts. With some items, such as wages, the total charge arises in the financial accounts but the analysis is provided by the costing section. The two examples which follow are related to the *Lingrove* exercises set out in this chapter.

No: 5	June 19–
<i>INTERNAL DEBIT SLIP</i>	
From: Financial accounts	
To: Cost accounts	
Purchases (direct materials)	£139,810
Details:	£
At standard prices:	
Raw materials	66,000
Components	73,110
	<u>139,110</u>
Price variance	+ 700
	<u>139,810</u>

No: 3	June 19–
<i>INTERNAL CREDIT SLIP</i>	
From: Financial accounts	
To: Cost accounts	
Closing stocks	£321,320
Details:	£
Raw materials	55,740
Bt components	63,580
Own components	91,995
	<u>211,315</u>
Finished goods	100,005
Indirect materials	10,000
	<u>321,320</u>

Checkpoints (see p.100)

<p><i>Financial accounts</i></p> <p>Cost of completed production transferred from manufacturing to trading account</p> <p style="text-align: right;"><u>£214,890</u></p>	<p><i>Cost accounts</i></p> <p>Cost of completed production transferred from work in progress to finished goods stock</p> <p style="text-align: right;">£</p> <p>At standard 213,290 (add back)</p> <p>Prime cost variance <u>1,600</u></p> <p>At actual <u>214,890</u></p>
<p>Production cost of sales per trading account</p> <p style="text-align: right;"><u>£215,285</u></p>	<p>Cost of products sold, transferred from finished goods stock to costing profit & loss account</p> <p style="text-align: right;">£</p> <p>At standard 213,685 (add back)</p> <p>Prime cost variance <u>1,600</u></p> <p style="text-align: right;"><u>215,285</u></p>
<p>Operating profit per profit & loss account</p> <p style="text-align: right;"><u>£27,934</u></p>	<p>Operating profit per costing profit & loss account</p> <p style="text-align: right;"><u>£27,934</u></p>

100 Variance Accounting

As the monthly work proceeds, both sets of accounts are kept continuously in agreement, routine checks being made at certain points.

Check points. Some of the earliest systems established a 'control' or 'adjustment' account in the financial general ledger and a matching account in the cost ledger. It is widely held that the so called 'cost control account' is the *key* to agreement between the two sets of accounts. In the *ICMA Terminology* (1974) the author indicated that the purpose of the *cost ledger contra account* is to maintain the double entry principle in the cost accounts.

In practice the check points illustrated on p. 99 are available. The specimen figures are extracted from the book-keeping exercise which follows and from the financial final accounts set out in Statement 9 (page 105).

Cost ledger. It is assumed that interlocking accounts are operated by Lingrove Instruments Limited. The following accounts in the cost ledger relate to the month of June and are linked with the financial accounts illustrated by Statement 9. Abbreviations used in the accounts are –

- Contra – cost ledger contra account
- CPL (1 or 2) – costing profit and loss account (part 1 or 2)
- PCV – prime cost variances account
- WIP – work in progress control account

<u>Cost ledger contra</u>			
CPL (1) (sales)	335,800	Opening stocks	319,340
Closing stocks:		(purchases)	
Raw materials	55,740	Raw materials	66,000
Indirect materials	10,000	Components	73,110
Bought components	63,580	Indirect materials	10,000
Own components	91,995	Prime cost variances	
Finished goods	100,005	(material price)	700
		WIP (direct wages)	71,765
		Overhead suspense	
		(indirect wages)	20,000
		Overhead suspense	
		(expenses)	68,271
		CPL (2) (operating	
		profit)	27,934
	<u>657,120</u>		<u>657,120</u>
<u>Raw material store control</u>			
Contra (opening stock)	55,000	WIP (issues to machining)	65,260
Contra (purchases)	66,000	Contra (closing stock)	55,740
	<u>121,000</u>		<u>121,000</u>

Indirect material store control

Contra (opening stock)	10,000	Overhead suspense	
Contra (purchases)	10,000	(issues)	10,000
		Contra (closing stock)	10,000
	<u>20,000</u>		<u>20,000</u>

Bought components store control

Contra (opening stock)	63,190	WIP (issues to assembly)	72,720
Contra (purchases)	73,110	Contra (closing stock)	63,580
	<u>136,300</u>		<u>136,300</u>

Own components store control

Contra (opening stock)	90,750	WIP (issues to assembly)	113,030
WIP (completed components to store)	114,275	Contra (closing stock)	91,995
	<u>205,025</u>		<u>205,025</u>

Work in progress control

Raw material store (issues)	65,260	Own components store	
Contra (direct wages)	71,765	(completed components)	114,275
Machining overhead		PCV (raw material usage)	260
(absorbed)	3,650	PCV (direct wages rate,	
Assembly overhead		machining)	325
(absorbed)	2,040	PCV (direct wages efficiency,	
Own components store		machining)	375
(issues to assembly)	113,030	PCV (direct wages efficiency,	
Bought components store		assembly)	100
(issues to assembly)	72,720	Finished goods stock	
PCV (direct wages rate,		(completed work)	213,290
assembly)	160		
	<u>328,625</u>		<u>328,625</u>

Finished goods stock control

Contra (opening stock)	100,400	CPL (1) (variable prod'n	
WIP (completed work)	213,290	cost of sales)	213,685
		Contra (closing stock)	100,005
	<u>313,690</u>		<u>313,690</u>

Overhead suspense

Contra (expenses)	68,271	Machining overhead	16,450
Indirect material store		Assembly overhead	6,140
(issues)	10,000	Production service overh'd	6,800
Contra (indirect wages)	20,000	Production general overh'd	18,165
		Gen. administration overh'd	21,100
		Marketing overhead	27,141
		Research & dev. overhead	2,475
	<u>98,271</u>		<u>98,271</u>

102 *Variance Accounting*

<u>Machining overhead</u>			
Overhead suspense (expenditure)	16,450	WIP (absorption, variable)	3,650
Overhead variances	<u>400</u>	CPL (1) (budgeted fixed overhead)	<u>13,200</u>
	<u>16,850</u>		<u>16,850</u>
<u>Assembly overhead</u>			
Overhead suspense (expenditure)	6,140	WIP (absorption, variable)	2,040
	<u>6,140</u>	CPL (1) (budgeted fixed overhead)	3,800
		Overhead variances	300
			<u>6,140</u>
<u>Production service overhead</u>			
Overhead suspense (expenditure)	6,800	CPL (1) (Budgeted fixed overhead)	7,500
Overhead variances	<u>700</u>		
	<u>7,500</u>		<u>7,500</u>
<u>Production general overhead</u>			
Overhead suspense (expenditure)	18,165	CPL (1) (budgeted fixed overhead)	17,575
	<u>18,165</u>	Overhead variances	590
			<u>18,165</u>
<u>General administration overhead</u>			
Overhead suspense (expenditure)	21,100	CPL (1) (budgeted fixed overhead)	20,600
	<u>21,100</u>	Overhead variances	500
			<u>21,100</u>
<u>Marketing overhead</u>			
Overhead suspense (expenditure)	27,141	CPL (1) (standard variable overhead)	18,491
	<u>27,141</u>	CPL (1) (budgeted fixed overhead)	8,475
		Overhead variances	175
			<u>27,141</u>
<u>Research and development overhead</u>			
Overhead suspense (expenditure)	2,475	CPL (1) (budgeted fixed overhead)	2,575
Overhead variances	<u>100</u>		
	<u>2,575</u>		<u>2,575</u>

Prime cost variances

Contra (material price)	700	WIP (assembly) (wages rate)	160
WIP (machining):		CPL (2) (trans. of balance)	1,600
(material usage)	260		
(wages rate)	325		
(wages efficiency)	375		
WIP (assembly)			
(wages efficiency)	100		
	<u>1,760</u>		<u>1,760</u>

Overhead variances

Assembly	300	Machining	400
Production general	590	Production service	700
General administration	500	Research & development	100
Marketing	175	CPL (2)	365
	<u>1,565</u>		<u>1,565</u>

Costing Profit and Loss

(Part 1)

Finished goods (variable production cost of sales)	213,685	Contra (sales)	335,800
Marketing overhead (variable)	18,491		
Fixed overhead as budgeted:			
Machining	13,200		
Assembly	3,800		
Production service	7,500		
Production general	17,575		
General administration	20,600		
Marketing	8,475		
Research & development	2,575		
Balance to part 2	29,899		
	<u>335,800</u>		<u>335,800</u>

(Part 2)

Prime cost variances	1,600	Balance from part 1	29,899
Overhead variances	365		
Contra (operating profit)	27,934		
	<u>29,899</u>		<u>29,899</u>

Variance accounts. In some systems there is a separate ledger account for each type of variance but this is unnecessary. In the Lingrove system there are only two variance accounts, one for prime cost variances and the other for overhead variances but the details are readily available.

Profit variances *due to selling prices and sales volume* have no place in the ledger accounts, and attempts to include them only lead to pointless manipulations. From the author's experience of the difficulties which this subject presented to students a footnote was appended to

the definition of 'operation profit variance due to sales' in the *ICMA Terminology* (1974). The footnote reads: 'this variance, and those which are part of it, would not be entered in a ledger account, as budgeted profit does not appear therein'. Sales should appear in the accounts *at actual* and, as the presentation of variances and other control information to management takes the form of memorandum statements, there is no need to create practical difficulties nor violate well founded accountancy conventions, which are not in question, merely for the purpose of including the sales variances in the formal ledger.

3. INTEGRAL ACCOUNTS

Explanation. Integral accounts are a single set of accounts which provide both financial and management accounting information. This concept may be preferred where production patterns are simple, as with quarrying and contracting.

General ledger. When a manufacturing company maintains integral accounts, the general ledger contains, in addition to the accounts which normally pertain to financial accounting, those accounts which, in interlocking accounts, are to be found in the cost ledger, but with two exceptions. These are –

- (i) *the cost ledger contra account*, which has no place in the financial accounts, and
- (ii) *the costing profit and loss account* (there is already a profit and loss account in the general ledger).

Wages clearing account. When net wages payable are drawn from the Bank each week the transaction arises: *debit* wages clearing account, and *credit* Bank. The amount of gross wages for the costing period is built up from these and other entries, via the general journal, PAYE tax and employees' contributions to national insurance and pension fund. Where costing periods are calendar months an amount may also be brought forward and/or an amount carried forward from the latter portions of split weeks. The wages clearing account thus provides a convenient means of collecting different entries forming parts of a whole amount, which can then be segregated into *direct wages* (transferred to work in progress control account) and *indirect wages* (transferred to overhead suspense account).

4. MANUFACTURING, TRADING AND PROFIT AND LOSS ACCOUNTS

Lingrove's financial final accounts for June are set out in Statement 9

below. Notice that the operating profit of £27,934 is the same as that shown in the costing profit and loss account in the cost ledger (page 103) and that there is also agreement at two other check points (page 99).

<u>Manufacturing Account</u>																																
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Stock of raw material and components commencing</td> <td style="width: 10%; text-align: right;">£</td> <td style="width: 10%; text-align: right;">208,940</td> </tr> <tr> <td>Purchases</td> <td></td> <td style="text-align: right;">139,810</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right; border-top: 1px solid black;">348,750</td> </tr> <tr> <td>- Stock of raw material and components ending</td> <td></td> <td style="text-align: right;">211,315</td> </tr> <tr> <td>Materials issued to production</td> <td></td> <td style="text-align: right;">137,435</td> </tr> <tr> <td>Direct wages</td> <td></td> <td style="text-align: right;">71,765</td> </tr> <tr> <td>Variable overhead absorbed</td> <td></td> <td style="text-align: right;">5,690</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">214,890</td> </tr> </table>	Stock of raw material and components commencing	£	208,940	Purchases		139,810			348,750	- Stock of raw material and components ending		211,315	Materials issued to production		137,435	Direct wages		71,765	Variable overhead absorbed		5,690			214,890		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Cost of manufacture to trading account</td> <td style="width: 10%; text-align: right;">£</td> <td style="width: 10%; text-align: right;">214,890</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">214,890</td> </tr> </table>	Cost of manufacture to trading account	£	214,890			214,890
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Cost of manufacture	214,890																															
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<u>Profit & Loss Account</u>																																
<p><i>Overhead:</i></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Production</td> <td style="width: 10%; text-align: right;">47,555</td> </tr> <tr> <td>- absorption</td> <td style="text-align: right;">5,690</td> </tr> <tr> <td></td> <td style="text-align: right; border-top: 1px solid black;">41,865</td> </tr> <tr> <td>General administration</td> <td style="text-align: right;">21,100</td> </tr> <tr> <td>Marketing</td> <td style="text-align: right;">27,141</td> </tr> <tr> <td>Research & development</td> <td style="text-align: right;">2,475</td> </tr> <tr> <td>Operating profit</td> <td style="text-align: right;">27,934</td> </tr> <tr> <td></td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">120,515</td> </tr> </table>		Production	47,555	- absorption	5,690		41,865	General administration	21,100	Marketing	27,141	Research & development	2,475	Operating profit	27,934		120,515		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Gross profit</td> <td style="width: 10%; text-align: right;">120,515</td> </tr> <tr> <td></td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">120,515</td> </tr> </table>	Gross profit	120,515		120,515									
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STATEMENT 9 *Financial Final Accounts*. This set of accounts relates to Lingrove Instruments Limited. It is linked with the set of cost accounts set out on pages 100-3.

CHAPTER 8

Absorption Costing

1. EVOLUTION OF THE CONCEPT

The earliest costing systems were devised for the purpose of ascertaining costs of products and services. The prevailing idea was that selling prices must exceed total costs to ensure profitability, and so it was natural that the total cost of each product or type of service having a separate selling price should be determined. This was particularly important in job order work where quoted prices had to cover all costs as well as provide profit.

Ways and means of identifying direct materials and labour with separate jobs or products were easily developed, but indirect costs posed greater problems. Where an item of expenditure bore no significant relationship to production a relationship had to be assumed.

A procedure was established, firstly, to apportion items of overhead over departments or cost centres using what was considered to be the most relevant basis of apportionment in each case, and secondly, to select a suitable basis of apportionment reflecting the comparative degrees of benefit from the service derived by the production cost centres, to spread over the latter the accumulated cost of each service cost centre. (In some situations, reciprocal services among service cost centres are recognised, and a more complicated procedure requiring numerous apportionments is followed, but in the end the entire expenditure is allotted to production centres.) Thirdly, to relate to products the accumulated overhead of each production centre by means of absorption rates such as percentage on direct wages or pence per direct labour hour or per machine hour.

This procedure is illustrated in simple form by Statement 10. Note that the first and second stages just described constitute the process of cost apportionment, whilst the third stage relates to overhead absorption. Cost apportionment is the allotment to two or more cost centres of proportions of common items of cost on the estimated basis of benefit received, whilst overhead absorption is the allotment of overhead to cost units by means of rates separately calculated for each cost centre. (In most cases the rates are predetermined.)

The hypothetical Lingrove company used as a model in preceding chapters prefers the marginal concept. To consider the ways in which the information produced would have differed had they opted for absorption costing it is necessary to work through an exercise in which the latter principle is applied.

2. BUDGETED FIXED OVERHEAD

(a) Fixed production overhead – apportionment and absorption. Statement 10 (page 108) illustrates the apportionment of budgeted fixed overhead not initially identified with specific budget centres, also the establishment of absorption rates. Note that a separate rate is calculated for each production budget centre.

(b) Other fixed overhead related to products. General administration expense, budgeted at £249,600 is found to represent 8 per cent of the budgeted cost of finished production, whilst research and development expense, budgeted at £31,200, is 1 per cent and marketing expense (fixed) is equivalent to 2½ per cent of budgeted sales.

3. STANDARD COSTS

Statement 11 (page 109) illustrates the standard costs of products inclusive of all overhead. Compared with the marginal version, Statement 2 (page 51), the latter shows contribution margins of £7.97 and £6.25 for models Y and Z respectively, whereas Statement 11 shows profit figures of £2.12 and £2.05 respectively.

4. MONTHLY BUDGET

Had the Lingrove company incorporated the absorption principle into their system, the budgeted profit for June would have been arrived at in the following manner –

108 *Variance Accounting*

	<i>Model Y</i> £	<i>Model Z</i> £	<i>Total</i> £
<i>Sales:</i>			
6500 x £26.00	169,000		
8500 x £20.00		170,000	339,000
<i>Cost of sales:</i>			
6500 x £23.88	155,220		
8500 x £17.95		152,575	307,795
<i>Profit:</i>			
6500 x £2.12	13,780		
8500 x £2.05		17,425	31,205

Apportionment of general production expenses as budgeted	Total £	Basis of apportionment £	Service £	Machining £	Assembly £
Factory administration	150,000	No. of employees	15,000	80,000	55,000
Rates	5,000	Area	500	2,500	2,000
Insurance	4,000	Valuation	500	2,000	1,500
Depreciation	30,000	Schedules	2,000	16,000	12,000
General maintenance	10,000	As authorised	500	5,000	4,500
Miscellaneous	15,890	No. of employees	1,590	8,500	5,800
	214,890		20,090	114,000	80,800
<i>Add:</i> Expenses directly allocated			91,440	160,940	46,330
			111,530	274,940	127,130
Apportionment of service expenses				82,660	28,870
				357,600	156,000
Budgeted standard hours				447,000	312,000
Absorption rate per standard hour				80 pence	50 pence

STATEMENT 10 – *Apportionment and Absorption of Fixed Production Overhead*. This relates to the annual budget and illustrates the apportionment of service budget centre expenses over production budget centres and the calculation of absorption rates. In practice the items of expense would be more numerous.

Lingrove Instruments Limited		1 April 19—						
STANDARD COST SHEET								
MACHINING COMPONENTS	YA		YB		ZA		ZB	
Direct materials	<i>units</i>	£	<i>units</i>	£	<i>units</i>	£	<i>units</i>	£
A @ 10p per unit	40	4.00			28	2.80		
B @ 4p per unit			25	1.00			25	1.00
Direct wages	<i>hrs</i>		<i>hrs</i>		<i>hrs</i>		<i>hrs</i>	
@ £1.25 per hour	2	2.50	1	1.25	1	1.25	1	1.25
Overhead:								
Variable @ 10p per hour		0.20		0.10		0.10		0.10
Fixed @ 80p per hour		1.60		0.80		0.80		0.80
		<u>8.30</u>		<u>3.15</u>		<u>4.95</u>		<u>3.15</u>
ASSEMBLY	Model Y		Model Z					
Manufactured components:		£		£				
YA	(1)	8.30						
YB	(1)	3.15						
ZA				(1)	4.95			
ZB				(1)	3.15			
Bought out components								
YC	(1)	5.39						
ZC				(1)	4.53			
		<u>16.84</u>			<u>12.63</u>			
Direct wages @ £1 per hour	<i>hrs</i>		<i>hrs</i>					
Overhead:	(2)	2.00	(1½)	1.50				
Variable @ 8p per hour		0.16		0.12				
Fixed @ 50p per hour		1.00		0.75				
<i>Production cost</i>		<u>20.00</u>		<u>15.00</u>				
General administration 8%		1.60		1.20				
Research and development 1%		0.20		0.15				
Marketing:								
Variable 5½% of selling price		1.43		1.10				
Fixed 2½% of selling price		<u>0.65</u>		<u>0.50</u>				
<i>Total cost</i>		<u>23.88</u>		<u>17.95</u>				
<i>Profit</i>		<u>2.12</u>		<u>2.05</u>				
<i>Selling price</i>		<u>26.00</u>		<u>20.00</u>				

STATEMENT 11 – *Standard Cost Sheet (Absorption Concept)*. Usually a separate sheet (or card) is prepared for each product.

MACHINING	AT STANDARD										ACTUALS	PRIMARY VARIANCES	
	Component YA		Component YB		Component ZA		Component ZB		TOTAL				
	£	per unit	£	per unit	£	per unit	£	per unit	£	per unit			£
	6600	8500	8300										
Units produced	6600	8500	8300									700	£
Price variance												700	
Material A	4.00	26,400		2.80	23,800		1.00	8,300		50,200		50,500	- 300
Material B	2.50	16,500		1.25	10,625		1.25	10,375		14,800		14,760	+ 40
Direct wages	0.20	1,320		0.10	650		0.10	830		3,650		3,650	- 700
Variable overhead	1.60	10,560		0.80	5,200		0.80	6,640		29,200		29,100	+ 100
TRANSFERRED TO COMPONENT STORE	8.30	54,780	3.15	20,475	42,075	4.95	26,145	143,475		145,035		- 1560	

ASSEMBLY	AT STANDARD										ACTUALS	PRIMARY VARIANCES	
	MODEL Y		MODEL Z		MODEL Z		TOTAL		TOTAL				
	£	per unit	£	per unit	Units	£ per unit	Units	£ per unit	£	per unit			£
	6600	8200	8200	15.00	8200	123,000	255,000	256,515	- 1515				
Variances bro./fwd												1,560	
Own components	11.45	75,570		8.10	66,420		37,146		141,990		141,990	-	
Bought components	5.39	35,574		4.53	25,500		12,300		72,720		72,720	-	
Direct wages	2.00	13,200		1.50	984		0.12	1,056		25,440		25,440	+ 60
Variable overhead	0.16	1,056		0.75	6,150		0.75	6,150		2,040		2,040	-
Fixed overhead	1.00	6,600		15.00	123,000		15.00	123,000		12,750		12,765	- 15
TRANSFERRED TO FINISHED STOCK	20.00	132,000	8200	132,000	8200	255,000	256,515	- 1515					

COST OF SALES AND PROFIT												
Variances bro./fwd												1,515
Trans. from stock												-
Marketing cost, variable												-
Marketing cost, fixed												245
Gen. administration												660
Res. & development												80
Total cost of sales	6700	20.00	134,000	8100	15.00	121,500	255,500	307,731	305,391	307,731	307,731	- 2340
Actual sales	6700	26.00	174,200	8100	20.00	162,000	336,200	335,800	336,200	335,800	335,800	- 400
PROFIT on actual sales	6700	2.12	14,204	8100	2.05	16,605	30,809	28,069	30,809	28,069	28,069	- 2740
Sales quantity difference	-200	2.12	-424	+400	2.05	+ 820	+396	-	+396	-	-	- 396
PROFIT (budgeted/actual)	6500	2.12	13,780	8500	2.05	17,425	31,205	28,069	31,205	28,069	28,069	- 3136

STATEMENT 12 – Primary Variance Analysis (*Absorption Concept*). This exercise determines the operating profit variance and its major component parts when the absorption principle applies.

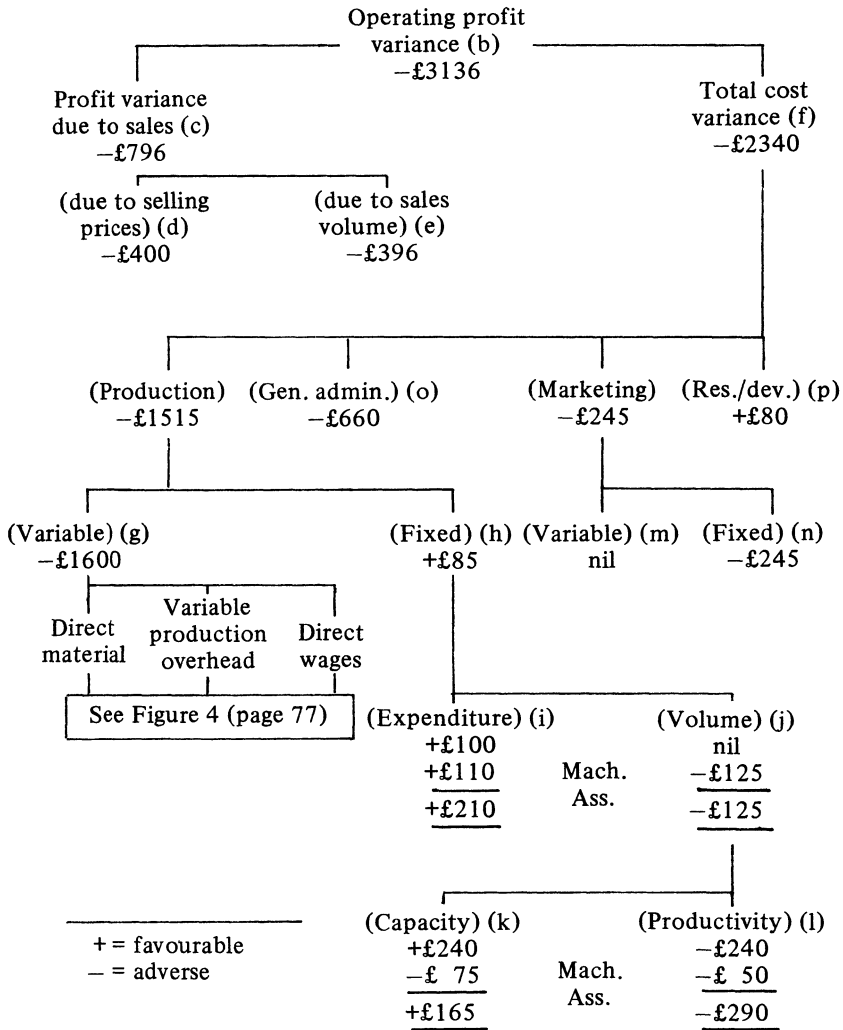


FIGURE 5 – Interrelationships of Variances (Absorption Concept)

The above analytical pattern is theoretical and intended to indicate general principles. In any specific organisation, variances would almost certainly be much more numerous, and many of them would have special relevance to the characteristics of the particular business. The letters in brackets which follow the titles cross-refer to the explanations on pages 113–16.

5. VARIANCE ANALYSIS

Figure 5 (page 112) illustrates variance analysis related to the absorption concept. (It differs from the diagram in the *ICMA Terminology* (1974) because the latter is *composite*, referring to both marginal and absorption concepts.) Figure 5 should be compared with Figure 4 (page 77) which depicts the marginal version.

Primary analysis

(a) *In general.* The general comments concerning primary variance analysis made on page 76 are valid in the context of this chapter, except that Figure 5 replaces 4 and Statement 12 (page 110) replaces 5.

(b) *Operating profit variance (–£3136).* This is the difference between budgeted and actual operating profit. The actual operating profit arrived at by the absorption procedure is £135 more than if the marginal procedure is used, and so the adverse profit variance (absorption) is lower by the same amount. Consider how this difference arises, as it highlights the fundamental difference between the marginal and absorption concepts. It is a feature of the absorption concept that stocks are valued at cost *inclusive of fixed production overhead*. In June, stocks of manufactured goods were higher at the end than at the beginning of the month, so that £135 of fixed overhead was added to the inventory value which, in the context of marginal costing, would have been written off as an expense. Details are shown below –

<i>Change in stock level</i>	<i>Fixed overhead included in valuation per unit</i>	<i>Increase in inventory valuation</i>
	£	£
Component YB – 100	0.80	– 80
Component ZA + 300	0.80	240
Component ZB + 100	0.80	80
Model Y – 100	3.40	–340
Model Z + 100	2.35	235
		<u>135</u>

The difference in the inventory valuation must of course be matched by other differences in the accounts, thus –

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- (i) the marginal variance analysis states the *profit variance due to sales volume* as £906 adverse, whilst the corresponding figure in the absorption analysis is £396 adverse, a difference of £510 fav.
- (ii) overhead volume variances are a feature of the absorption concept only. These (all adverse) are

	£	
<i>production volume variance:</i>		
production overhead	125*	
<i>sales volume variances:</i>		
marketing	70*	
general administration	160*	
research and development	20*	£375 adv.
		<u>£ 135 fav.</u>

*The validity of these variances is discussed on page 117 (subsection (q)).

- (c) *Operating profit variance due to sales* (–£796). This is the difference between –
 - (i) the budgeted operating profit and
 - (ii) the margin between the actual sales and the standard cost of those sales.

It is the sum of the two variances which follow. See analytical formula 1 (page 118).

(d) *Operating profit variance due to selling prices* (–£400) is the difference between the standard and actual prices of the sales effected. If desired it may be analysed by products. This variance is not affected by the choice of concepts. See analytical formula 1.

(e) *Operating profit variance due to sales volume* (–£396) is the difference between budgeted and actual sales quantities, both being valued at standard unit operating profit margins. Notice that the marginal version of this variance is –£906, the shortfall of sales being valued at contribution. See analytical formula 1.

(f) *Total cost variance* (–£2340). This variance, which has no marginal counterpart because of the differing analytical patterns, is the difference between actual operating profit and the margin between actual

sales and the standard cost of those sales. See analytical formula 1.

(g) *Variable production cost variance (-£1600)*. As in the marginal analysis, this is the difference between the standard variable cost of the production achieved, whether completed or not, and the actual variable cost incurred on such work. The detailed breakdown of this variance is illustrated in Figure 4 (page 77) and described on pages 79 and 82, whilst analytical formulae 3, 4 and 5 (pages 84–7 are also relevant.

(h) *Fixed production overhead variance (+£85)* is the difference between the standard cost of fixed overhead absorbed in the production achieved, whether completed or not, and the fixed overhead attributed and charged to that period. The marginal counterpart is +£210, and relates to expenditure only. Analytical formula 2 (page 119) shows that in the absorption procedure an adverse volume variance of £125 arises, thus reducing the overall variance to +£85. This offset is also illustrated in Figure 5 (page 112).

(i) *Fixed production overhead expenditure variance (+£210)* is the difference between the budget cost allowance for production for a specified control period and the amount of actual fixed expenditure attributed and charged to that period. See analytical formula 2. In practice it is often found more satisfactory to determine overhead expenditure variances for fixed and variable overhead combined. (See ‘Validity of variable overhead variances’, page 91).

(j) *Fixed production overhead volume variance (-£125)*. Having no counterpart in the marginal analysis, this is the difference between the standard cost absorbed in the production achieved, whether completed or not, and the budget cost allowance (page 68) for a specified control period. See analytical formula 2 (page 119) and observe how this variance is split into causes (*capacity* and *productivity*).

(k) *Capacity variance (+£165)* is that portion of the fixed production overhead volume variance which is due to working at higher or lower capacity than standard. Capacity is often expressed in terms of average direct labour hours worked per day, and the variance is the difference between the budget cost allowance (page 68) and the actual direct labour hours worked (valued at the standard hourly absorption rate). See the example set out in analytical formula 2.

(l) *Fixed cost productivity variance (-£290)* is that portion of the fixed production overhead volume variance which is the difference between the standard cost absorbed in the production achieved, whether completed or not, and the actual direct labour hours worked (valued at the standard hourly absorption rate). The calculation is exemplified in analytical formula 2.

(m) *Variable marketing cost variance (nil)*. In practice it is often found more satisfactory to determine overhead expenditure variances for the fixed and variable portions combined (see page 91) and this concept is maintained in all worked exercises in this book. To avoid conflict between different illustrations and worked examples the variable marketing cost variance is taken as nil. The variance, where it is recognised, is the difference between the standard and actual variable marketing costs of the products actually sold.

(n) *Fixed marketing cost variance (-£245)* is the difference between the standard cost of fixed marketing overhead absorbed in the cost of sales achieved, and the fixed marketing overhead attributed and charged to the period. If it is considered worthwhile (this is discussed in Subsection (q)) this variance can be analysed into expenditure and sales volume variances as exemplified in analytical formula 3 (page 120). The sales volume variance of -£70 accounts for the disparity between this variance and the marginal counterpart of -£175, which relates to expenditure only.

(o) *General administration cost variance (-£660)* is the difference between the total standard cost of general administration included in the total standard cost of the products sold and the actual expenditure incurred on general administration. Such expenditure would usually be deemed to be fixed in nature. If it is considered worth while (this is discussed in Subsection (q)) this variance can be analysed into expenditure and sales volume variances as exemplified in analytical formula 3 (page 120). The sales volume variance of -£160 accounts for the disparity between this variance, and the marginal counterpart of -£500, which relates to expenditure only.

(p) *Research and development cost variance (+£80)* is the difference between the total standard cost of research and development included in the total standard cost of the products sold and the actual expenditure incurred on research and development. Such expenditure would

usually be deemed to be fixed in nature. If it is considered worthwhile (this is discussed in Subsection (q)) this variance can be analysed into expenditure and sales volume variances as exemplified in analytical formula 3 (page 120). The sales volume variance of $-\pounds 20$ accounts for the disparity between this variance and the marginal counterpart of $+\pounds 100$, which relates to expenditure only.

(q) *Validity of fixed overhead volume variances.* (i) (Based on production volume.) Whether or not the fixed production overhead volume variance has real significance is debatable (see arguments A3 and M3 in Chapter 9). Any significance claimed arises from the doctrine that fixed production overhead forms part of the value of finished and partly finished goods in stock. (ii) (Based on sales volume.) Fixed costs of marketing, general administration and research and development form no part of inventory value and the expenditure is fully written off in the period in which it is incurred whether the absorption or the marginal principle applies. There appears therefore to be no grounds on which the volume variances can be said to serve anything but a purely academic purpose. In the context of the Lingrove exercise (absorption version) there is presented –

Profit variance due to sales volume $\pounds 396$ adv.

Then the following separate variances are presented –

Fixed overhead volume variances –	£
marketing	70 <i>adv.</i>
general administration	160 <i>adv.</i>
research and development	20 <i>adv.</i>
	<hr/>
	250 <i>adv.</i>
	<hr/>

Here we have four different variance figures presented to management and yet all clearly arise from the same cause, namely, that in the month in question actual sales were lower than budgeted. In the marginal presentation they are rightly combined in a single variance.

Analytical formulae

Formula 1. This shows how the Lingrove operating profit variance would have been analysed had that company applied the absorption costing concept. The first analysis is into total cost variance (*f*) and profit variance due to sales (*c*) and the latter is then analysed into variance due to selling prices (*d*) and variance due to sales volume (*e*).

	£	
Actual sales	335,800	
<i>less</i>		
Actual cost of sales	307,731	
= Actual profit	28,069	
Actual sales	335,800	
<i>less</i>		
Standard cost of sales	305,391	
	<u>30,409</u>	
Actual sales at standard prices	336,200	
<i>less</i>		
Standard cost of sales	305,391	
	<u>30,809</u>	
Budgeted sales*	339,000	
<i>less</i>		
Budgeted cost of sales*	307,795	
	<u>31,205</u>	

Total cost variance
£2340 *adv.*

Profit variance due to sales
£796 *adv.*

due to selling prices
£400 *adv.*

due to sales volume
£396 *adv.*

Operating profit variance
£3136 *adv.*

*See page 108

Formula 2. This shows the analysis of the fixed production overhead variance into expenditure (*i*) and volume (*j*), also the sub-analysis of the latter into capacity (*k*) and productivity (*l*).

	<i>Machining</i>	<i>Assembly</i>	<i>Total</i>
<i>Data:</i>	£	£	£
(i) Actual expenditure	29,100	12,765	41,865
(ii) Budgeted expenditure	29,200	12,875	42,075
(iii) Actual direct hours worked @ standard absorption rates			
36,800 x 80p	29,440		
25,600 x 50p		12,800	42,240
(iv) Standard hours produced @ standard absorption rates			
36,500 x 80p	29,200		
25,500 x 50p		12,750	41,950
<i>Variances:</i>			
Capacity variances (ii)–(iii)	240 <i>fav.</i>	75 <i>adv.</i>	165 <i>fav.</i>
Productivity variances (iii)–(iv)	<u>240 <i>adv.</i></u>	<u>50 <i>adv.</i></u>	<u>290 <i>adv.</i></u>
Volume variances (ii)–(iv)	nil	125 <i>adv.</i>	125 <i>adv.</i>
Expenditure variances (i)–(ii)	<u>100 <i>fav.</i></u>	<u>110 <i>fav.</i></u>	<u>210 <i>fav.</i></u>
Fixed production overhead variances (i)–(iv)	<u>100 <i>fav.</i></u>	<u>15 <i>adv.</i></u>	<u>85 <i>fav.</i></u>

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Formula 3. This provides for the analysis of fixed overhead (other than that relating to production) into expenditure and sales volume sub-variances. Whether or not these sub-variances are useful is debatable and this subject is discussed in Subsection (q) (page 117).

<i>Data:</i>	<i>Marketing</i>	<i>General adminis- tration</i>	<i>Research & develop- ment</i>
	£	£	£
(i) Actual expenditure*	8,650	21,100	2,475
(ii) Budgeted expenditure**	8,475	20,600	2,575
(iii) Units sold at standard cost per unit*	8,405	20,440	2,555
(*as shown on Statement 12, page 110)			
(**as shown on Statement 5, page 80)			
<i>Variances:</i>			
Expenditure variances (i)–(ii)	175 <i>adv.</i>	500 <i>adv.</i>	100 <i>fav.</i>
Sales volume variances (ii)–(iii)	70 <i>adv.</i>	160 <i>adv.</i>	20 <i>adv.</i>
Fixed overhead variances (i)–(iii)	245 <i>adv.</i>	660 <i>adv.</i>	80 <i>fav.</i>

CHAPTER 9

The Choice – Absorption or Marginal Costing?

1. INTRODUCTION

After absorption costing had held sway for many years its basic principle – that the total actual cost of each cost unit was essential information – was challenged by advocates of marginal costing who maintained that the needs of management would be better served by the substitution of *marginal* costing. This claim was received with a mixture of caution, scepticism and open hostility. Some writers postulated that the main use of marginal costing was to provide information to assist in reaching decisions which varied in nature and were of the ‘once only kind’. They contended that such information should be ascertained by ad hoc investigation only, rather than by incorporation into the routine costing system. What was probably not fully realised when the pros and cons of the rival concepts were first debated was the way in which the issues were affected by the choice made between a separate pair of rival techniques, viz, actual cost ascertainment versus variance accounting (or budgetary control and standard costing as the latter technique was then termed). *The arguments for and against marginal costing when actual cost ascertainment applies are not the same as the arguments which are valid when the system features variance accounting.*

In many cases systems were changed to incorporate the use of budgets and standard costs but the absorption principle was retained, marginal costing being restricted to certain ad hoc exercises. With the passing of time however, accountants turned their attention to the possibility of adopting the marginal principle in conjunction with variance

accounting, and many of those in the mass production field came to the conclusion that this combination more adequately satisfies the needs of the companies they serve.

2. DIALOGUE

The opposing arguments are attributed to two imaginary accountants Messrs Abbot and Marr (the names are chosen for their mnemonic value). Both agree that (i) there must be a routine accounting system which, period by period, provides valuations of work in progress and stocks, reveals significant fluctuations in detail and determines the profit or loss realised, and (ii) as no routine system will automatically provide figures to suit every possible requirement, some information must be derived from ad hoc exercises. Where they differ, however, is that Mr. Abbot considers that the routine system should be based on absorption costing whilst Mr. Marr prefers marginal costing. Note clearly that what are being considered are the comparative merits of absorption and marginal costing when applied *within a system featuring variance accounting*.

(*Abbot*)

A1 The values attributed to stocks and work in progress are critical, as they are a determinant of profit earned. Goods would not be manufactured without such facilities as factory premises, equipment and management, so that expenditure on such resources is as much a part of the cost of production as direct materials and wages. Finished or partly finished products on hand at the close of an accounting period should be valued at 'cost' inclusive of all expenditure incurred in bringing the goods to their current location and condition. Stocks are produced in expectation of future revenue, and when this does not arise until a later period it is appropriate to carry forward this cost to be

matched with the revenue when it arises.

This concept is illustrated by the following hypothetical statement, greatly simplified but nevertheless a valid example of the point made. Assume that budgeted production and sales volume is 120,000 units per month and budgeted fixed overhead is £120,000 per month. Note in particular that the fuller use made of fixed overhead resources in April is reflected in the better financial result.

	£ per unit	April		May	
		'000 units	£000	'000 units	£000
Commencing stocks	3	30	90	75	225
Variable production cost	2	150	300	105	210
Fixed overhead (absorbed)	1		150		105
		<u>180</u>	<u>540</u>	<u>180</u>	<u>540</u>
(less)					
Closing stocks	3	<u>75</u>	<u>225</u>	<u>45</u>	<u>135</u>
Production cost of sales		<u>105</u>	315	<u>135</u>	405
(less)					
Overhead over-absorbed			30		
(plus)					
Overhead under-absorbed			<u> </u>		<u>15</u>
Adjusted cost of sales			285		420
Sales	4	<u>105</u>	<u>420</u>	<u>135</u>	<u>540</u>
Profit:			<u>135</u>		<u>120</u>

(Marr)

M1 What Mr. Abbot has advanced is a *point of view*. An alternative point of view which merits equal consideration is that fixed period costs are incurred in relation to the passing of time and not to quantities of goods produced. As such they are attributable to the period in which they are incurred and in mass production situations should not be carried forward to a subsequent period. (In job order work the circumstances are different in that jobs in progress are already covered by firm orders).

So far, theory is matched by theory, but what really matters is *the effectiveness of the information produced in providing assistance to management*. There is ample evidence that variances arising from marginal costing are much more meaningful and dependable than those based on the absorption principle. The profit statement supported by Mr. Abbot is unrealistic in that it shows a reduced profit in May despite a considerable increase in sales, whilst unit costs and selling prices remained constant. Management cannot be expected readily to accept that profit can be earned merely by increasing stocks rather than by effecting sales, even if this theory is somewhat traditional. A company which builds up stocks in anticipation of a boom which fails to occur may be deluded by their own accounts until it is too late to take remedial action. The following statement, using the same basic

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data is consistent with the marginal costing principle, stocks being valued at variable cost only.

	£ per unit	April		May	
		'000 units	£000	'000 units	£000
Commencing stocks	2	30	60	75	150
Variable production cost	2	<u>150</u>	<u>300</u>	<u>105</u>	<u>210</u>
		180	360	180	360
(less)					
Closing stocks	2	<u>75</u>	<u>150</u>	<u>45</u>	<u>90</u>
Variable cost of sales		105	210	135	270
Sales	4	<u>105</u>	<u>420</u>	<u>135</u>	<u>540</u>
Contribution			210		270
(less)					
Actual fixed overhead			<u>120</u>		<u>120</u>
Profit:			<u>90</u>		<u>150</u>

(Abbot)

- A2 It is stipulated in *Statement of Standard Accounting Practice, No. 9* that stocks and work in progress should be valued at the lower of cost or net realisable value, and 'cost' is defined as including full production overhead notwithstanding that this may 'accrue wholly or partly on a time basis'.

(Marr)

- M2 SSAP9 applies to *published annual accounts* only and not to management accounts produced at intervals throughout the year. If the marginal costing principle is applied to management accounts the requirements of SSAP9 can easily be

met by an annual ad hoc distribution of fixed production overhead over cost centres and products. Clause 9 of Appendix 1 to SSAP9 states 'where management accounts are prepared on a marginal cost basis, it will be necessary to add to the figure of stock so arrived at, the appropriate proportion of those overheads not already included in the marginal cost'.

(*Abbot*)

- A3 Variance accounting (marginal) does not reveal the *production volume variance* but, instead, places the emphasis on *sales volume*. The production and sales functions are separate and their results should be judged separately. For example there may be a substantial favourable production volume variance, which indicates that the production manager should be complimented on having made fuller use of available resources than was expected and thus having reduced the average cost of production. On the other hand, there may be a large adverse sales quantity variance which suggests that the sales manager should explain why a loss has been incurred in consequence of the failure of his department to achieve its planned objective. In a marginal presentation in similar circumstances the performance of the sales function is assessed but not that of the production function.

(Marr)

M3 The idea that the heads of the production and sales functions operate independently each endeavouring to 'beat the budget', is a complete negation of that co-ordination so vitally important to the efficient running of the organisation. In the long term, production and sales must be equated and the efforts of the production and sales functions must be co-ordinated by direction from top management in order that production and sales may be geared to a common flexible programme which takes account of current trends.

A production failure could result in lost sales or a shortage of orders could necessitate a cut back in production. Excessive production could create financial difficulties and the need to reduce later production. An energetic sales campaign at a time when there are restrictions on productive capacity could be disastrous. Whether the performance of either function merits praise or disapproval is a matter to be decided *by management* after proper investigation of the facts and not one to be prejudged by the accountant's theoretical calculations.

Profit is earned, not when goods are produced, but when they are sold. A sales quantity variance (marginal concept) recognises that failure to sell results not only in loss of profit margins but also loss through partial non-recovery of

period costs.

The overhead volume variances calculated for general administration, marketing and research, in absorption costing, are pointless. They are clearly derived from differences between budgeted and actual sales and should be included in the sales quantity variance, as they are when the marginal concept is applied (*This view coincides with that presented more fully in Sub-section (q), page 117*)

(*Abbot*)

- A4** Fixed overhead resources are not always common to all products. Special equipment or the expertise of a specialist technician may be concerned exclusively with a specific product or group of products. Surely the utilisation of resources by different products should be taken into account and management should be informed as to how the *full* cost of each product compares with the selling price? Figures which do not reflect the use of resources by products are misleading.

(*Marr*)

- M4** In the mass production field pricing policy is related to external factors rather than to cost, and the need to determine *full* cost more frequently than once each year seldom arises. As the routine system cannot provide information suitable for every conceivable requirement it is desirable that it should be concentrated on the provision of figures most

likely to yield maximum benefit to management. Variance accounting linked with the marginal concept is more conducive to effective control.

The need for an annual ad hoc distribution of fixed production overhead for purposes of published annual accounts is acknowledged in **M2** and this would take account of the utilisation of resources by different products. Such figures would also meet any need of management.

(Abbot)

A5 The apportionment of semi-variable overhead into fixed and variable categories is approximate. Marginal costing relies on a distinction between these categories and, because of inaccuracy, gives rise to misleading information.

(Marr)

M5 There is admittedly a degree of approximation in the segregation of overhead costs into fixed and variable categories, but this is by no means serious and it should not be exaggerated. The variable portion of overhead is comparatively small and many large items can safely be regarded as wholly fixed within the limits laid down. There is a greater degree of arbitrariness in relating fixed overhead to products. The objection is even more pointless when, in order to arrive at volume variances in absorption costing, one relies on the same segregation because volume variances only relate to fixed overhead.

(Abbot)

- A6** In marginal costing fixed overhead is written off as incurred. A company which has a seasonal trade would show heavy losses in that part of the year when trade is slack even though valuable stocks of products may be created.

(Marr)

- M6** This is an imaginary difficulty. Only internal accounts are affected and the information presented to management is so arranged that the true situation is disclosed. Whilst it should not be necessary, there would be no difficulty in carrying forward, in suspense, appropriate values until the year end, a device which is sometimes applied in absorption costing when fluctuating production levels give rise to substantial over or under absorption of overhead.

(Abbot)

- A7** In marginal costing direct labour is treated as a variable cost. As industry tends to become more capital intensive the cost of all employees is becoming fixed in nature.

(Marr)

- M7** There is some truth in that statement but it is not a valid argument against marginal costing. In extremely capital intensive industries the operatives' wages are logically classified as fixed overhead, leaving direct materials and certain amounts of overhead within the

classification of variable cost. In such cases the marginal concept may be effectively applied. There remains a high proportion of manufacturing industry in which there are still overwhelming reasons for treating operatives' wages as variable costs. (*If Mr. Marr had detailed the 'overwhelming reasons' they would have been as set out on pages 42–3.*)

(Mr. Marr makes further points in support of the marginal concept)

M8 A feature of those systems incorporating absorption costing is the considerable amount of apportionment of items of expense which takes place. For example, local government rates are apportioned over cost (or budget) centres; then there is reapportionment of the accumulated costs of service centres over production centres. The overhead of a specific production centre therefore contains fragments of numerous items of expense.

The technique of variance accounting aims at providing information *for purposes of control* and apportioned costs are not suitable for such a system. Suppose there is an adverse variance of £300 on rates, what point is there in reporting a £40 variance for this item in centre A, a £55 variance in centre B and so on? Obviously, the variance should be shown as one figure. Moreover, the cost variances arising within a budget centre are more readily assimilated if they are not

mixed with fragments of variances which have occurred elsewhere.

M9 Policy decisions often call for marginal cost information. Whilst each instance could be the subject of an ad hoc exercise, for the figures to be readily available from the routine system is a considerable convenience.

CONCLUSION

For some years the comparative merits of absorption and marginal costing have been controversial. The foregoing dialogue attempts fully and fairly to present the opposing points of view. If it is so accepted the conclusion is that, *where standardised goods are produced and the variance accounting technique is applied*, there is a strong case for preferring the marginal costing principle.

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