A STUDY OF SOME ASPECTS OF THE USE OF MANAGEMENT ACCOUNTING FOR ACHIEVING AN EFFECTIVE CONTROL OF COSTS IN SOME FIRMS OF THE SOUTH AFRICAN FLEXIBLE PACKAGING INDUSTRY.

A THESIS PRESENTED TO THE UNIVERSITY OF CAPE TOWN

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MASTER OF COMMERCE

by

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Professor I. Taylor who acted as supervisor.

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Mrs E. Ryan who typed the thesis

I certify that, except as noted above, the thesis is my own work and all references are accurately reported.

R N C BEATTIE
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The packaging industry in South Africa is a large and diversified one. To classify all the applications would be well nigh impossible. Flexible packaging forms a very important part of the packaging industry and is itself divided into three basic groups, namely, the suppliers of basic materials, the converters and the product manufacturers who produce their own flexible packages. This thesis is concerned with the most prominent of these groups, namely the converters, that is, with those firms who convert basic materials into various forms of flexible packages, for product manufacturers.

Flexible packages are now considered an integral part of the finished product and with the extensive application of flexible packaging for a very wide range of consumer products, they form part of the cost structure of these consumer products.

The cost of flexible packaging is dependent upon a number of factors, such as the cost of the many different types of raw materials supplied to the converters and the cost of the highly specialised labour used. However the ability of converters to control costs, that is, to keep production costs within acceptable limits is the most important factor. The effective control of costs is to a large degree dependent upon the successful application of management accounting techniques. This thesis attempts, as its prime object, to evaluate the use of such techniques in helping to achieve an effective control of costs in the converting firms.

This study is not a critique of the industry but was undertaken as a sincere attempt to study the application of management accounting techniques in an industry which faces special problems in regard to the effective control of costs. Accordingly the
study does not attempt to make any comparisons of costs between member firms of the industry.

The first part of this study gives a brief account of the universal development of flexible packaging. Furthermore, because the South African flexible packaging industry is of growing importance in the economy, it was felt necessary to preface this study by a brief account of the industry's economic importance and development in South Africa. Due attention was also paid to the competitive pressures which prevail in this industry, in the realisation that the selling prices of flexible packaging constitute the costs of flexible packaging to the buyers of this form of packaging. Accordingly, as a cost, its variance will affect the prices of a wide range of consumer products.

METHODOLOGY

In order to obtain the necessary data for the study, the following methods were adopted:

(i) An initial questionnaire was sent to all converters of flexible packaging raw materials in the Republic. This questionnaire requested certain information for the purpose of determining the size, growth and significance of the industry in the economy. This was a necessary procedure because of the scarcity of published data on the flexible packaging industry in South Africa. Most published data relates to the packaging industry as a whole.

(ii) A second questionnaire was sent to the firms, seeking information as to their use and application of management accounting techniques for achieving cost control.

(iii) Discussions took place with executives in some of the
firms - the purpose of which was to obtain more detailed information in regard to (ii) above and also to take account of any problems encountered by firms in their efforts to control costs effectively.

(iv) Management Accounting literature was researched and studied in order to compare modern management accounting practices applied in controlling costs with those management accounting practices used in the surveyed firms.

Response from the Industry

Questionnaires were sent to all firms which were considered to fall within the meaning of "Flexible packaging converter". The total number of firms falling within this category in South Africa is fifteen.

Although some other packaging firms and a few jobbing printers also produce some quantities of flexible packaging, this forms only a small part of their output and the total quantity is not considered significant from an industry point of view. Consequently these firms were not included in the survey.

It should be appreciated that the industry in South Africa is a very competitive one. Therefore it was to be expected that for strategic reasons some firms might be reluctant to participate in the study or to disclose certain data, particularly cost information.

However, notwithstanding these circumstances, it is gratifying to disclose that twelve of the firms in the industry, including the three largest producers of flexible packaging in South Africa, co-operated in the project to one extent or another. (See Page (ix))
In seeking the co-operation of firms, assurances were given to all the participating firms, that individual firms would not be identified in the thesis with the data supplied by them. A further assurance given to firms was that all information supplied would be treated in the strictest confidence by the writer of this thesis and his supervisor.

Conclusions and Recommendations

The conclusions drawn from the results of the field study are summarised in Chapter VI of the thesis. These conclusions are dealt with under three major headings, namely:

(1) Budgeting and Budgetary Control
(2) Production Cost Control
(3) Control of Research and Development Costs

Certain basic difficulties faced by firms in applying flexible budgeting and standard costing are also referred to.

In addition, the conclusions also indicate the necessity for firms to innovate, in order to meet the changing demands of the market. This latter function gives rise to research and development costs in firms. This in turn poses certain problems with regard to the control, disposal and recovery of these costs.

As a result of the research findings five specific recommendations, together with a number of relevant illustrations are made in Chapter VII.

It is sincerely hoped that the recommendations will, where applicable, prove of some value to firms in the survey.
Limitations and Constraints

It has not been possible to deal with all the aspects of cost control in the surveyed firms. The reason being that some firms did not, for strategic and confidential reasons, answer all the questions. For example, only three firms gave details of their methods of allocating factory overheads. Consequently, it was not possible to draw any valid conclusions as regards the general practice of allocating overheads in firms.

In many instances practices and procedures in firms vary in scope, so it has been necessary to generalise the practice.

For reasons of cost, time and distance it has not been possible to visit all firms in the survey, in order to gain further knowledge of their use of management accounting techniques. Interviews were, however, held with executives in five of the surveyed firms.
LIST OF SURVEYED COMPANIES

Amalgamated Packaging Industries Limited (Reed-Nampak Group)
British Flexible Packaging (Pty) Ltd.
Colpak (Pty) Ltd.
DRG Flexible Packaging (Dickinson Robinson Group)
DRG Sacks Ltd. (Dickinson Robinson Group)
General Packaging Company Limited (Kohler Brothers Limited)
Hypack Products (Pty) Ltd.
Multifoil (Pty) Ltd.
plasticwrap (Pty) Ltd.
polyfoil Packaging (Pty) Ltd.
Pretoria Paper Products (Pty) Ltd.
Safepak (Pty) Ltd.
CHAPTER I: THE FLEXIBLE PACKAGING INDUSTRY

1.1 SOME ACCOUNT OF THE IMPORTANT FACTORS WHICH CONTRIBUTED TO THE GROWTH OF THE FLEXIBLE PACKAGING INDUSTRY

1.2 SOME MODERN DEFINITIONS OF PACKAGING AND FLEXIBLE PACKAGING

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CHAPTER I : THE FLEXIBLE PACKAGING INDUSTRY

1.1 SOME ACCOUNT OF THE IMPORTANT FACTORS WHICH CONTRIBUTED TO THE GROWTH OF THE FLEXIBLE PACKAGING INDUSTRY

Packaging goes back to the dawn of history. Any item that had to be stored or transported called for packaging and this led to the use of leaves, gourds, skins, reed baskets, earthen-ware vessels and an assortment of other items. In time containers were improvised to meet the need of agrarians, merchants and traders. (1)

Up until about 1800 the making of packages was essentially a craft or art and consequently packages were costly items, particularly in terms of labour. (2)

In England about this time packaging for consumer goods, consisted largely of paper wrappers and hand-made paper bags. (3)

The Expansion of Markets

Before the beginning of the nineteenth century there had been little need to sell goods under a particular mark or brand, as business was very localised and self-contained. "The steady increase in prosperity during the nineteenth century created opportunities for those gentlemen known as entrepreneurs to expand their markets for these localised products". (4)

The expansion in marketing activities led to an increase in the demand for suitable packaging which resulted in an increase in the production of printed paper wrappers and paper bags. This development increased the scale of production for these forms of packaging and provided a firm economic footing for these early producers of flexible
packaging. (5)

**Technical developments**

Two other events, which were of technical nature, helped to consolidate the economic position of these early producers of paper packaging. The first was the invention of a printing process by Alois Senefelder in Germany in 1798, known as "Lithography". (6) This lithographic process, which made use of the "offset principle" had many advantages over the old letterpress process. Two of these advantages were that it produced improved quality of printing on paper and did so at very much greater speeds. These advantages in quality and economy brought further gains to the growing industry.

**The Invention of Paper Bag Machines**

The second important event was the invention and application of paper bag machines.

"The first commercially successful paper-bag machine was patented in 1859 by James Arkell, Benjamin Smith and Adam Smith of Canajoharie, New York State". (7)

The first of these machines was imported into England in 1873, by Elisha Robinson of Bristol, a manufacturer of stationery, paper wrappers and hand-made paper bags. The importation of these machines revolutionised the paper bag industry in England. (8)

"In 1883 the first machinery for self-opening grocery bags was built by Union Bag and Paper Corporation, now
part of the great Union-Bag Corporation of New York". (9) In addition waxed paper had been patented in the United States in 1866. (10)

During this period, the latter half of the nineteenth century - "packaging was used for protection only, consideration of consumer convenience and package appearance being quite unnecessary. The only function the package was asked to do was that which is still the first essential - to carry and protect the product between the producer and the consumer". (11)

By 1920 it was apparent that packaging was changing the buying habits of consumers in Britain. Brand names were becoming common place. The consumer was reaping benefits in the form of convenience and guarantees. (12) The advantages of the well-wrapped, packed and branded products met with increasing consumer approval. It prevented waste; it guaranteed cleanliness; it was easy to transport, easier to store and sell; no weighing, no wrapping at the counter.

Flexible packaging which by now had added plain and printed wax coated papers to its range of packaging, featured prominently in these developments, as flexible packaging was well suited to meet the packaging requirements of protection, convenience and printed brand names. (13)

By 1930 manufacturers and designers were giving attention to the possibilities of design in relation to packaging. (14)

"The shops were crowded with packages of every size, shape and colour, and it was becoming obvious that something
was needed to give them individuality and character". (15)

**Co-ordination** in packaging in respect of design, technical and marketing requirements was greatly helped by the publication of a monthly magazine on British packaging entitled "Shelf Appeal", which made its first appearance in 1933. It created a forum for the interchange of packaging and merchandising ideas. This publication had an enormous influence on the development of flexible packaging in Britain. (16)

In 1937 "Shelf Appeal" staged an International Packaging Exhibition where British packaging could be seen alongside those of America and other countries. (17)

An interesting comment on this exhibition was "But for sheer marketing and technical excellence, the Americans still held the field". (18)

**Developments in the United States**

It was perhaps understandable that the Americans led the field in packaging. Their progress in packaging and particularly in flexible packaging was closely related to the rapid economic development that took place in the United States during the second half of the nineteenth century.

The phenomenal increases in population brought about mainly by large scale immigration, established large markets of consumers. This expanding of the American population continued into the twentieth century and provided a widening market for the output of the nation and
as incomes rose the market expanded and consumers with greater educational background became more sophisticated and knowledgeable. (19)

The American population grew from 76 million in 1900 to 123 million in 1930. This rapid increase led to a continuous search for new and better channels of distribution and marketing of consumer goods, particularly foodstuffs. (20)

The Influence of the Supermarkets

The answer to this problem came largely in the form of the supermarkets. It was the advent of the supermarkets in the 1930's, which dealt primarily in food and grocery-store products on a self-service basis, that gave great impetus to the need for flexible packaging. By 1960 supermarkets had become common place. "As of 1960 there were 33 000 supermarkets; they accounted for over two-thirds of the country's food sales". (21)

Apart from these developments in machinery and marketing which greatly influenced the growth of the flexible packaging industry, a third factor gave added momentum to its growth. This was the introduction of new flexible packaging materials.

The Introduction of New Flexible Packaging Materials

Until about 1900 paper had been the main raw material used in flexible packaging. Between 1900 and 1930 the introduction of glassine (Glazed greaseproof paper), kraft paper (a much stronger form of paper than used hitherto), cellophane and aluminium foil, all helped to broaden the
whole base of the flexible packaging industry. The introduction of these new materials featured prominently in meeting the new demands of consumers, in relation to the packaging function. (22)

However, cellophane and aluminium foil were much more costly than paper, cellophane being approximately five times and aluminium foil being approximately eight times the cost of paper.

It was the discovery of "Polyethylene" by Imperial Chemical Industries Limited in 1933 that provided the flexible packaging industry with a material which approached the ideal. Polyethylene film which resulted from the chemistry of plastics, only became available on a commercial scale in the early post-war years. "Polyethylene film, particularly that made from low-density polymer, has become in the post-war years a major flexible packaging material. The reason for this rapid growth is its low cost per unit area combined with many desirable properties". (23)

The extent of this rapid growth is indicated by the following. "The first useful quality of 8g of polyethylene was obtained in 1935 and from that small beginning, world production has risen to more than 2 million tons per year, accounting for almost one quarter of all plastics made in the world". (24)

Further post-war advances in plastic technology produced many other flexible materials such as polyvinylchloride and nylon films (See Appendix II)

In addition to these new basic materials that became
available for flexible packaging, a number of laminated and coated materials have also, in recent years, been produced (See Appendix II) Each of these materials possesses special qualities that are required for the successful marketing of particular consumer products.

Most of these laminated and coated materials have been produced as the result of research and development by manufacturers of flexible packaging and as such give rise to special costs.

1.2 SOME MODERN DEFINITIONS OF PACKAGING AND FLEXIBLE PACKAGING

Not so long ago 'packaging' meant little more than doing up a parcel with brown paper and string. But many changes have taken place in the last thirty to forty years, and today the word has found a new meaning.

To-day, virtually all goods that are manufactured or processed require packaging in some phase of their production or distribution and in all modern economies packaging plays an important role, as it forms an integral part of the marketing system.

Although there are many different forms of packaging using a vast range of raw materials, such as woven cloth; paper and paper-board, tinplate, glass, raw plastics etc. it is possible to define packaging, by and large, as a general field of industrial endeavour.

"Packaging" in general and in it's modern form is defined as "the art, science and technology of preparing goods for transport and sale". (25)
More specifically "Packaging" is defined as a "means of ensuring the safe delivery of a product to the ultimate consumer, in sound condition at the minimum overall cost". (26)

Packaging has also been defined as "an economic activity which plays an important role in the production and distribution chain of the majority of goods. While providing protection and preserving quality, packaging can increase the storage life of a product and create sales appeal. It can extend, furthermore, the market for any product". (27)

Orlin E. Johnson, Vice President of the Bristol-Meyers Company, New Jersey, U.S.A. in an article entitled "Packaging in the 1960's: A Decade of Challenge" (28) defined packaging as "The art and/or science concerned with the development and use of materials, methods, and equipment for applying a product to a container (or vice versa) designed to protect it throughout the various stages of distribution". He went on to comment that "this is a very bare-bone definition of packaging, and says nothing about the merchandising and advertising functions which many packages serve, or about the matter of aesthetics, or about the utility or convenience of the package itself to the ultimate consumer".

It is in relation to consumer goods that packaging plays its most important role, since the function of packaging and particularly flexible packaging, is not only to protect but also to assist in its sale and to ensure its continuing sale.

Flexible Packaging is a specialised field of packaging
which forms an important part of the packaging industry. Flexible packaging is defined as "Packaging manufactured from paper in its various forms, regenerated cellulose, cellulose acetate, rubber hydrochloride, polythene film, polyvinylchloride (P.V.C) film, polypropylene film, nylon film, metallic foil and combinations of certain of these as laminations, converted into bags, carrier bags, wrappers, over-wraps, reels, sachets and other related forms of packages". 

(A detailed description of the raw materials contained in this definition appears in Appendix II.)

1.3 THE MODERN ROLE OF FLEXIBLE PACKAGING

The four main functions of flexible packaging today are:

1. **Protection** which will keep the product safe, in a clean and hygienic state and also give the necessary protection on its journey to the consumer's home and then until it is fully expended and then thrown away.

2. **Utility** - it must identify and quantify its contents and help to facilitate distribution.

3. **Motivation** - the package must contribute to the selling efficiency by motivating customers to buy for the first time and then to buy again.

4. **Profitability** - perhaps the most important function of a package is to do all its intended jobs so well and at such an efficient cost level that it will help assure continuing sales at a good level of profit.
Other important factors are convenience, versatility and light weight. These are the reasons why flexible packages are an important and growing category of packaging. There are four major constructions: bags, wrappers, pouches and envelopes.

Within this group of basic constructions there are many variations. Bags, for example, are available in four standard styles, namely flat-shaped, gusseted, self-opening satchels and rose bottom.

In addition, the range of variation in packages is still further increased by the use of different raw materials which are determined by the size, weight and nature of the contents and other functional factors.

One large company in the survey, classifies as many as seventy distinctive product groups for the purpose of product sales analysis.

Flexible packages derive many of their advantages from the very wide range of functional and decorative materials of which they are made. Included are papers, cellophane, aluminium foil, plastic films, numerous laminations and very many different grades of these materials.

Bags and envelopes are supplied pre-formed. Traditionally bags are used for packing tea, coffee, sugar, flour, produce etc. Envelopes are produced in many different constructions for specialised uses e.g. saw blades.

Pouches, produced on form-fill-seal equipment, are a very important form of convenience packaging. They handle a
very wide range of products such as cereals, snack foods, confectionery, liquids, hardware items and some items of clothing. They excel for unit-packaging of such products as salt, sugar and sauces. They are widely used on airlines, in restaurants and for take-away foods.

Pouches are increasingly being used for liquid and semi-liquids - candidates are milk, fruit juices, extracts, anti-freeze and motor oil.

Wrappers are traditional packages for fresh meat, bread, confectionery and textiles. Current developments in the application of wrappers is the use of shrink wrap films. Shrink wrapping produces a neat contoured fit. The application of heat causes the film to draw down tight around a product or package. Successful applications include wraps for records and recording tape, toys, paper products, meat and produce. Shrink film is also increasingly used as a case wrap and as a pallet wrap, where it unitizes and protects the load. Wrappers are not only a very effective, convenient and popular consumer package but they also have important applications in industrial and delivery packaging.

Flexible Packaging and foods

The largest user of flexible packaging is foods. Flexible materials lend themselves to freezing, cooking, mixing, preserving and dispensing and have had a dramatic impact on the food industry especially in the successful development and marketing of convenience foods. Cook-in packages make preparation easier for both the home and the institutional server of foods.
Flexible vacuum packages are a successful method for packaging bacon, hams, dried beef, luncheon meats, prepared foods, nuts, cheese and other items. Vacuum or gas packaging preserves quality and flavour and assures customers of a better product. (31)

Medicinal and Health Care

The use of flexible packaging in the medical field has grown greatly in the last decade. An important requirement in this field is sterilisation. To-day many medical items such as disposable surgical gloves and blades, syringes, sutures, catheters, needles, towels, blood administering sets, injectable systems and many other medical supplies are sold in sterilised flexible packages. Many are packaged in the envelope-type packages which are made from various combinations of paper and film.

The packaging of prescription and proprietary drugs, especially in unit-of-use form is a rapidly growing market for flexible materials. (32)

Household and Industrial Products

Household, industrial and hardware products are making greater use of flexible materials to do more of their packaging jobs. Machinery parts are packaged in polyethylene bags. Hardware manufacturers have replaced bulk packaging of nails, screws, wires, tools and other products with small transparent pouches and envelopes. (33)

Multi-Wall Paper Sacks

Paper sacks are made from several thicknesses or plies of
paper inside one another so that the total load imposed on the sack during handling and when subjected to strain is distributed over all the plies. The number of plies in any particular sack may vary from 2 to 6 according to its use.

Prior to the 1939-1945 war the use of multi-wall paper sacks was confined to powdered materials such as lime, cement and basic slag. To-day they are used for many different commodities and the list is continually growing.

The introduction of plastic sacks has made large inroads into the packaging of fertilizers in paper sacks and may capture markets for other products requiring high weather resistance. However, plastic sacks as opposed to paper, have a number of disadvantages which render them unsuitable for packaging many products. A case in point is the bulk packing of sugar. (34)

Baler Bags

Baler bags may be defined as flexible containers for a number of smaller units or consumer packages.

As their name implies they were first used in connection with the packaging of bales of wool. Baler bags are now used for packing a variety of small units such as bottles and cartons.
1.4 SOME ACCOUNT OF THE FLEXIBLE PACKAGING INDUSTRY IN SOUTH AFRICA

The flexible packaging industry in South Africa evolved from two main sources. One source can be described as independent entrepreneurs who were mainly immigrants who possessed the necessary technical skills. Some of these immigrants arrived in South Africa in the very early part of this century. The other source was by way of parent or associated companies in Britain or America, who saw the potential that existed in South Africa and established their South African counterparts in this country. In this way many of the overseas developments in flexible packaging came to be applied in South Africa.

1.4.1 STRUCTURE OF THE INDUSTRY

A characteristic of the South African flexible packaging industry is the dominance of three large organisations, two of which have the benefit of overseas technical assistance and to a lesser extent financial assistance. The overseas assistance is notably from associated companies in Britain and America.

The growth of these larger organisations, apart from market developments, has been due to mergers and amalgamations.

Although the bulk of flexible packaging in South Africa is produced by the three large company groups namely, the Dickinson Robinson group, Kohler Brothers Limited and the Reed-Nampak group, collectively, a significant amount of flexible packaging is also produced by the remaining eleven independent firms, some
of whom specialise in certain kinds of flexible packaging, such as the conversion of plastic or cellulose films.

The size of the industry can be viewed in terms of turnover, production and the number of persons engaged in the industry.

In order to determine the size of the industry in terms of the above criteria and also to obtain knowledge of its growth, questionnaires requesting the relevant information for the years 1965 and 1975 were sent to all flexible packaging converters. Similarly forecasts for the year 1980 were also requested, so that some indication of expected immediate growth could be obtained.

In view of the fact that three firms did not submit the required data, estimates of their turnover, production and number of employees are taken into account. Likewise the comparatively small amounts of flexible packaging produced by some firms whose main line of business is other forms of packaging, were also taken into account. These estimates were arrived at with the assistance of executives in the industry.

**TURNOVER**

The turnover for the industry in 1965 was of the order of R19 million but in the following ten years phenomenal growth took place, such that in 1975 the annual turnover was of the order of R85 million – an average annual growth rate of 16.1% for this ten year period.
Furthermore the information supplied indicates that by 1980 the industry's turnover will be of the order of R115 million per annum. This indicates an average annual growth rate for the 1975-80 period of 6.3% per annum thus revealing a very much reduced growth rate when compared with the previous ten years.

The turnover figures are particularly significant because apart from giving some indication of the size and growth of the industry, they also represent the costs of packaging for a very wide range and volume of consumer products in South Africa. (See p. 22)

PRODUCTION

The information supplied by firms, together with supplementary estimates, reveals that the quantity of raw material converted by the industry was of the order of 33 000 tonnes in 1965 and 86 000 tonnes in 1975. Forecasts for 1980 indicate that raw material conversion, for the industry, will be of the order of 103 000 tonnes.

EMPLOYMENT

Likewise the data in respect of employment, reveals the following:
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<th>Year 1965</th>
<th>Year 1975</th>
<th>Year 1980</th>
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<tbody>
<tr>
<td><strong>Number of Employees</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>engaged in activities relating to:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1225</td>
<td>2480</td>
<td>2550</td>
</tr>
<tr>
<td>Non-Manufacturing</td>
<td>590</td>
<td>860</td>
<td>880</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1815</td>
<td>3340</td>
<td>3430</td>
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1.4.2 THE IMPORTANCE OF THE FLEXIBLE PACKAGING INDUSTRY IN THE SOUTH AFRICAN ECONOMY

The importance of packaging in the economy has been brought more and more into the realm of public consciousness with the increasing sophistication of demand and consumer requirements. The packaging industry's growth has been closely correlated to that of South Africa's economic growth over the past two decades. The growth of packaging has also been closely linked to developments in marketing.

The growing importance of packaging in South Africa is indicated by the annual cost of consumption of packaging materials. The following extract which appeared in the Barclays Bank Trade Review of July 1967 gives some indication of this.

"PACKAGING - KEYSTONE TO MARKETING.

A vital aspect of all industrial activities, packaging has undergone remarkable development since the end of the Second World War, mainly as a result of the introduction of an extensive range of new materials, improved techniques in fabrication and the stimulation created by an ever-growing consumer demand for goods of greater variety. It is hardly surprising, therefore, that an amount of some R83,9 million was spent on packaging alone in South Africa during 1959/60, according to the latest Industrial Census. Current indications are that turnovers in the packaging industry have doubled since that date. Statistics reveal, furthermore, that the principal contributors
to this total were the foodstuffs and chemical industries, spending R38.5 million and R18.6 million, respectively on packaging materials during 1959/60."

The latest manufacturing industrial census statistics are in respect of the 1967/68 period. This indicates that the total amount spent on packaging in South Africa was R163.5 million (See AppendixIII for analysis) which bears out the accuracy of the Barclays Bank Trade Review's forecast.

In view of the continued rate of economic growth during the 1968 to 1975 period, it would not be unrealistic to assume that expenditure on packaging again doubled during the next seven years to about R320 million in 1975.

In a Netherlands Bank survey of the packaging industry in 1969, estimates were quoted of the total expenditure on packaging material and of the annual growth rate as follows:

"Total expenditure on packaging materials was estimated at R132 million in 1961, rising to R227 million in 1967 - an average annual growth rate of 9.5% per annum. It is not considered however, that this rate can be maintained to 1973, the end year of the latest Economic Development Programme. Instead, a figure of 8.8% is regarded as more reasonable. On this basis expenditure in 1973 should amount to R380 million."

In the light of the 1967/8 industrial census data it would appear that the Netherlands estimate of R227 million in 1967 is somewhat overstated and consequently
the figure of R380 million for 1973 may be considered overstated by about R60 million. Therefore the estimated annual consumption of packaging materials in 1975 of R320 million can be considered a more correct one. Accordingly it can be concluded that flexible packaging in South Africa with a turnover of R85 million in 1975, forms about twenty five percent of the total expenditure on packaging.

Apart from forming a significant part of the packaging industry the importance of the flexible packaging industry in the national economy is also reflected in the wide range of industries, trades and products supplied with flexible packaging. Evidence of this fact is revealed by answers to the questionnaire (See Appendix I Q.7 and Table 1 p. 22)

Within the categories shown in Table I there is a large assortment of consumer products, covering in the majority of cases, many different sizes, shapes and weights all of which are packed and marketed in some type of flexible packaging. This necessitates the production of an almost endless variety of flexible packages.
### TABLE 1

**INDUSTRIES, TRADES AND PRODUCTS SUPPLIED WITH FLEXIBLE PACKAGING BY THE SURVEYED FIRMS**

<table>
<thead>
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<th>Industry</th>
<th>Flexible Packaging</th>
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<tr>
<td>Animal Feeds (2)</td>
<td>Fertilizers (4)</td>
</tr>
<tr>
<td>Baking (8)</td>
<td>Fresh Produce (5)</td>
</tr>
<tr>
<td>Beverages (3)</td>
<td>Frozen Foods (3)</td>
</tr>
<tr>
<td>Building (2)</td>
<td>Horticultural (3)</td>
</tr>
<tr>
<td>Canning (2)</td>
<td>Hospitals (1)</td>
</tr>
<tr>
<td>Cement (2)</td>
<td>Maize (2)</td>
</tr>
<tr>
<td>Charcoal (2)</td>
<td>Meat (4)</td>
</tr>
<tr>
<td>Chemical (4)</td>
<td>Milling (3)</td>
</tr>
<tr>
<td>Clothing (5)</td>
<td>Motor (1)</td>
</tr>
<tr>
<td>Confectionery (7)</td>
<td>Oil (1)</td>
</tr>
<tr>
<td>Dairy (4)</td>
<td>Paint (2)</td>
</tr>
<tr>
<td>Edible Oil (1)</td>
<td>Paper (2)</td>
</tr>
<tr>
<td>Explosives (1)</td>
<td>Pharmaceutical (4)</td>
</tr>
</tbody>
</table>

( ) Indicates number of surveyed firms supplying flexible packaging.

No published figures exist showing the cost of flexible packaging in relation to the sales values of commodities packed in this form of packaging. However the published data shown in Appendix IV, serves as an interesting guide as many of the commodities listed are, as evidenced by Table 1, packed in some form of flexible packaging.

As flexible packaging features so prominently in the packing of so many foodstuffs and other consumer products in South Africa, the control of flexible packaging production costs is worthy of study.
1.4.3 **THE SIGNIFICANCE OF COMPETITION IN THE INDUSTRY**

It is generally acknowledged that in the long term, costs determine selling prices but in the short term many non-cost factors influence the determination of prices. Among these non-cost factors, **the degree of competition** is one of the most important factors. As the selling prices of flexible packaging are the costs of packaging for a whole host of consumer products, the influence of competition in the industry on selling prices, is also worthy of study.

**COMPETITIVE FACTORS IN FIRMS**

Firms, through their executives, were requested to express their opinions of the part played by various competitive factors in the industry, on a quantitative basis. The competitive factors which were considered as possibly being significant in the industry were listed in the questionnaire. A scale of 1 to 10 was used to assess the effects of each factor (e.g. 1 = hardly any effect, 5 = a moderate effect, 10 = plays a vital part.)

The following is the result of ten firms, including the three largest, supplying answers to this section of the questionnaire. (See Table 2 p. 24)
The initial conclusion to be drawn from this section of the survey is that, the biggest competitive factor in the industry is price competition. In view of its high rating, it would appear that price competition in the industry is of a rather intense nature.

In discussions with executives in the industry it was revealed that intensive price competition exists mainly in the cheaper forms of flexible packaging, such as plain and printed paper bags. It was stated that numerous "price wars" had occurred in the past. An executive pointed out that although price competition existed in other types of flexible packaging, price competition was less marked in the more specialised forms of flexible packaging, where usually some form of technical advantage (discussed below under "technical know-how") enabled a manufacturer to

<table>
<thead>
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<th>Competitive Factor</th>
<th>Total Maximum Points Possible 100</th>
<th>Degree of Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling Prices</td>
<td>90</td>
<td>1</td>
</tr>
<tr>
<td>Quality of Product</td>
<td>85</td>
<td>2</td>
</tr>
<tr>
<td>Delivery Dates</td>
<td>80</td>
<td>3</td>
</tr>
<tr>
<td>Technical &quot;Know-How&quot;</td>
<td>72</td>
<td>4</td>
</tr>
<tr>
<td>Customer Attachment</td>
<td>51</td>
<td>5</td>
</tr>
<tr>
<td>Size of Orders</td>
<td>48</td>
<td>6</td>
</tr>
<tr>
<td>Fixed overheads in total cost</td>
<td>48</td>
<td>6</td>
</tr>
<tr>
<td>Credit Terms</td>
<td>38</td>
<td>7</td>
</tr>
<tr>
<td>Possession of Product</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patents</td>
<td>37</td>
<td>8</td>
</tr>
<tr>
<td>Scale of Production (Capacity)</td>
<td>34</td>
<td>9</td>
</tr>
</tbody>
</table>
charge a higher price than he would otherwise be able to charge.

**Quality of Product** was considered to be the second competitive factor of importance. Executives enlarged on this by pointing out that the buyers of flexible packaging demanded high standards of quality, particularly in regard to package appearance and protectiveness. The importance of "shelf-appeal" of food products in a supermarket was a case in point. In the case of food products high standards were also demanded of the protective quality of the package.

The survey further revealed that "delivery dates" ranked third in order of importance in respect of competitive factors in the industry and was graded at 80 points out of 100. The meaning attached to "delivery dates" is the ability of a flexible packaging manufacturer to promise and deliver the required packaging to the product producer, in accordance with requested dates.

The emphasis on the importance of "delivery dates" in these circumstances, is due to the fact that product manufacturers would incur increased costs, if the relevant packaging for products coming off their production lines was not available at the right time. This is particularly true in the case of non-durable goods such as foodstuffs. The increased costs could be due to physical deterioration of the unpacked products; a reduction in output resulting in a higher incidence of fixed costs or the possibility of having to make overtime payments for labour to cope with the
build-up of unpacked products when once the packaging became available.

Executives in the industry point out that in many cases obtaining an order is heavily dependent upon their being able to guarantee delivery of the packaging in terms of a stipulated delivery date. Some executives stated that in some cases, prices were of secondary importance to delivery dates, in so far as firms sometimes secured an order at a higher price than that quoted by their competitors where the promised delivery date proved more favourable to the product manufacturer.

On occasions some of the smaller firms have been able to secure orders at higher prices than they would normally have been able to obtain because the machines of the larger firms have been heavily booked with orders involving long runs.

Technical "Know How" was ranked fourth in order of importance as a competitive factor and was fairly highly graded at seventy two points. The meaning attached to technical "Know How" is the special or extra technical knowledge that a particular manufacturer possesses in the production of some type of flexible packaging.

This special knowledge, where it exists, has usually been gained as the result of research and development over a number of years. In some cases the knowledge has been "passed on" from associated companies overseas and in this respect, the companies with overseas
connections do have an advantage over the other companies. This extra knowledge may relate to a machine process or the make-up of adhesives or printing inks or the production of special purpose laminated flexible materials. It may also be related to the ability of a manufacturer to meet very rigid packaging specifications which may be demanded by a customer for a particular product.

An example of this special knowledge in regard to the make-up of adhesives and printing inks, is the manufacture of flexible packaging for medical products used in hospitals or surgeries. Here sterilisation is of the utmost importance and the packaging manufacturer has to safeguard against the sterilisation being affected by certain properties of the adhesives or printing inks which would normally be the case. Only some manufacturers possess the necessary knowledge to ensure that the sterilisation would not be affected by these materials.

Another illustration of a manufacturer possessing special technical knowledge which enables his firm to meet a customer's strict requirements in respect of specifications, is the case of printed aluminium foil laminated wrappers, used for wrapping margarine. This type of flexible packaging is sold in reel-form to the margarine producer. The reels are mounted on an automatic wrapping machine which wraps the margarine at fairly high speed. Special requirements for the success of this operation are, accuracy of print, perfect alignment and the precise positioning of register marks to guarantee no variation in the
length of the wrapper. If these specifications are not strictly adhered to, the margarine producer will experience increased costs on his packaging operation.

It is worthy of note that one company has recently perfected a flexible package for the marketing of motor oil. This is a wholly South African innovation which may now have an international impact on the packaging and retailing of motor oil. The price of this package is very much less than the traditional tin can. Should there be a very wide application of this package, the very technical "Know How" necessary to produce it, will place the manufacturer in a very favourable position as regards the fixing of a selling price.

The technical advantages possessed by some firms are largely the result of research and development. The larger companies having greater resources for research and development work do have an advantage over the smaller firms in this respect.

"Customer attachment" ranked fifth in order of importance as a competitive factor but was graded at only fifty-one points. "Customer attachment" signifies the willingness or the desire of a customer to continue to purchase his packaging from the same manufacturer, owing perhaps to either a long past association and satisfaction given in respect of past supplies of flexible packaging.

The weighting of fifty-one points indicates that "customer attachment" in the industry is not a strong
competitive feature in securing an order. The explanation given by some executives in the industry, is that good past relationships between the supplier and purchaser of flexible packaging is no guarantee that the supplier would obtain this customer's next order or future orders. It was pointed out that any one of the previously mentioned factors could pre­dominate and prove the determining factor in the ob­taining of an order.

The size of orders and the amount of fixed overheads in total cost were equally ranked as sixth in degree of importance and were each awarded forty-eight points. In regard to the size of orders, executives explained that there was a tendency for packaging manufacturers to try and secure large orders, at acceptable prices. For example, orders for printed bags from chain stores or bazaars but it was emphasised that manu­facturers would be greatly influenced by their own machine bookings at the time. If their production machines were not heavily booked they would endeavour to obtain large orders by quoting keener prices.

It was stated that manufacturers were often requested by bazaars and chain stores to quote prices for very large orders consisting of a whole range of printed bags. Coupled with this, there was usually a stipulation that the order should be delivered (and invoiced) in four parts, once every three months over a twelve-month period.

This type of order created the problem requiring a decision to be made as to whether it was better,
from a cost point of view, to produce the order in four separate batches, at times suitable to effect to effect delivery of each batch or on the other hand to produce the whole order at one time and thereby achieve some economies in production. If this latter step was undertaken, increased stock holding costs would be incurred.

"Credit terms" do not appear to feature prominently as a competitive factor in the industry, being ranked seventh in degree of importance and with a weighting of only thirty-eight points.

"Product patents" relate to patent rights acquired by a flexible packaging manufacturer enabling his company to manufacture a special type of package under the patent agreement. The package usually has some special feature or quality that makes it specially suitable for packing some consumer product or products.

The possession of such product patents by manufacturers of flexible packaging does not appear to be a very significant competitive factor in the industry, being lowly ranked in eighth position of importance and with a weighting of only thirty-seven points out of a possible one hundred points.

As a result of discussions with executives in the industry, the reasons put forward for this are firstly, that only a few product patents exist in the industry. Secondly some of the existing patents have outlived their usefulness due to developments in marketing and packaging while other patents have expired in terms of
the patent agreement.

However some product patents do exist in the industry. As such they give the possessor a decided advantage as a protection against competition inasmuch as the granting of a patent confers on the patentee a short-term monopoly, that is, the exclusive right of manufacturing and selling the patented product. Under these circumstances the manufacturer is able to command a higher price for the resultant packaging than would be the case if the package was able to be freely produced by the other manufacturers.
1.4.3.1 ECONOMIC ANALYSIS OF COMPETITION IN THE INDUSTRY

As a result of this survey and assessment of the influence of various competitive factors in the industry, it is possible to draw some valid overall conclusions in respect of the effect of competition on prices in the industry. This is perhaps best explained in terms of economic theory and terminology.

For the purpose of simplifying analysis, economists analyse competition under four major headings. These headings are basically sets of conditions which make for particular markets. They are not exhaustive of all conditions but they are sufficient for a description of general principles.

(i) **Pure Competition:** This occurs when a sufficiently large number of buyers and sellers exists to preclude market control by any one or a small number of sellers or producers. In this state of affairs buyers will buy from sellers who offer the lowest price and sellers will sell to buyers who offer the highest price, other things being equal.

(ii) **Pure Monopoly:** This refers to the market for a particular product wherein there is no close substitute for that product and the firm producing it can alter price, as it thinks fit. The test of the existence of a monopoly usually
lies in the ability of the monopolist to increase price to a fair degree without losing sales.

(iii) Oligopoly: This refers to a market wherein "a few sellers (or producers)" produce products which are identical or closely substitutable. Each firm selling realises that a variation in its price or output may induce a variation in the same factors of one or more competitors. The essence of oligopoly is that firms are few enough to recognise the impact of their actions on their rivals and thus on the market as a whole. When one firm cuts its price, it considers the possibility that sales "snatched" from its rivals may cause them to cut their prices too. This is a new and distinctive element of market conduct found only in oligopolistic industries. In oligopoly they react to one another in a direct and personal fashion. This inevitable interaction of sellers (or producers) in an oligopolistic market is called mutual interdependence.

Where mutual interdependence exists, sellers do not just take into account the effect of their actions on the total market - the balance of supply and demand, and the price which the product will fetch. They also take into account the effect of their actions on one another.

(iv) Monopolistic competition: Here the firm is selling in a market containing differentiated
products of a similar kind. This situation brings about a fairly independent pricing policy. The number of firms is usually greater than in the case of oligopoly but no one firm is affected to a significant extent by a change in the price of another firm. Sufficient product differentiation is presumed to exist to permit sellers some freedom of action in establishing individual product prices.

FIELD STUDY CONCLUSIONS

From the results obtained in the survey and coupled with the fact that there are comparatively few manufacturers of flexible packaging in South Africa, it can be concluded that oligopolistic conditions do exist in the industry. However, these conditions appertain only to the more standardised type of flexible packaging, namely, plain and printed bags. Furthermore the occurrence of "price wars" in this sector of the business and the lengthy periods of "rationalisation" which have usually followed these "price wars", are indications that mutual interdependence is also a characteristic of the industry.

In addition the survey reveals that an element of monopolistic competition also exists in the industry. As explained on pages 26 - 28, this arises as a result of the technical superiority of some firms, in respect of some of the more specialised types of flexible packaging and also to a lesser extent owing to the possession of packaging patents. Where
these advantages exist the manufacturers concerned are able to charge a higher selling price than would be the case if all the other manufacturers were similarly equipped.

Finally it is concluded that competition is an important non-cost factor which influences the determination of selling prices of flexible packaging in South Africa. At the same time it is recognised that competition in the industry provides an incentive for each firm to increase productivity, that is, to produce more at lower unit cost in order to maximise profits.

In this connection it is noteworthy that the report of the British Productivity Team on Industrial Engineering in the United States, repeatedly emphasised the contribution to high productivity made by competition by stating: "It is our opinion that, more than any other factor, competition provides the drive for the more frequent analysis of costs and the application of industrial engineering techniques in the United States, and the constant effort to achieve the most economic usage of men, materials, machines and money". (38)

It is generally acknowledged however that in the long term, selling prices are determined by costs of production or more correctly the average costs of production. The costs of production of flexible packaging are influenced
by a number of factors but chief among these are the cost of raw materials and the cost of converting the raw material. Firms in the industry obtain their raw materials both locally and from overseas, the prices of which are dictated largely by the supply and demand situations existing at the time.

The costs of converting the raw material are however within the sphere of control of each firm. Furthermore the effective control of all costs is largely dependent upon the application of appropriate techniques of Management Accounting.
CHAPTER I : FOOTNOTES


(2) Ibid : P.30.


(7) Journal : "Paper Film and Foil Convetcor" 1962 : Article : "103 Years Young";


(13) Ibid : p.54.


(30) MODERN PACKAGING ENCYCLOPEDIA 1969 : Article : "Introduction to Packaging" : (Editorial) : p.29.
(35) Publication : "CAPE TOWN" : A record of the mother city from the earliest days to the present, By J. R. Shorten, : Published under the authority of the City Council of Cape Town to mark the Golden Jubilee of the greater city. 1963.
Article : "From Acorn to Oak Tree - the Herzberg Mullne Group of Companies" : pp. 326 - 328.
NOTES ON QUESTIONNAIRE NO. 1

1. The main purpose of this questionnaire, is to be able to evaluate the growth and development of the flexible packaging industry in South Africa over the past ten years and also to give some indications of the possible future growth. Secondly I wish to indicate the importance of the industry in the national economy.

2. Only total figures for the industry will be published.

3. Should actual data not be available or readily available, reasonable estimates will be acceptable.

4. "Group" Companies will receive more than one set of questionnaires, as it is possible that they have more than one subsidiary company in their group engaged in flexible packaging.

5. Should the number of sets of this questionnaire, that is, number one, sent to you, be more than is applicable, kindly return the excess questionnaires marked "Not Applicable".

6. Please do not hesitate to add any relevant comments on the questionnaire.

7. Kindly return questionnaires to:
MR. R.N.C. BEATTIE
P.O. BOX 6705
ROGGEBAAI, C.P.
8012.

THANK YOU FOR YOUR HELP.
For companies engaged in the manufacture of flexible packaging (i.e. Converters) (see definition)

COMPANY CODE: •••••• ••••

1.1 Annual turnover in 1965 (to nearest 1000)

2.1 Tonnage of major material (paper, film, polyethylene etc.) converted in 1965

2.2 Tonnage of major material converted in 1975

2.3 What tonnage do you estimate will be converted in 1980

3.1 Number of employees engaged in Manufacturing during 1965

3.2 Number of employees engaged in Manufacturing during 1975

3.3 What number of employees do you estimate will be employed in Manufacturing in 1980

Annual turnover in 1975 (to nearest 1000)

Annual turnover in 1980. (Ignore inflationary factor)
4.1 In regard to your company's ability to expand sales over the next three to five years, would you please indicate which of the following factors (and the extent), you consider, will influence your company's ability to expand sales during this period. (Items A and B).

Please mark appropriate block with a cross.

<table>
<thead>
<tr>
<th>Factors</th>
<th>To a great degree</th>
<th>To a moderate degree</th>
<th>To a slight degree</th>
<th>No degree</th>
</tr>
</thead>
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<td><strong>A. AVAILABILITY OF:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Capital (issued &amp; or loan)</td>
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<tr>
<td>2. Cash resources within company or group</td>
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<tr>
<td>3. Skilled labour</td>
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<tr>
<td>4. Semi-skilled labour</td>
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<td>5. Raw materials</td>
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<td>6. New production equipment</td>
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<td>7. Patent rights</td>
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<td>8. Other (please specify)</td>
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<table>
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<tr>
<th>B. COSTS OF:</th>
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</thead>
<tbody>
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<td>1. Raw Materials</td>
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<tr>
<td>2. Labour</td>
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<td>3. Manufacturing overheads</td>
<td>[ ]</td>
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<tr>
<td>4. Selling</td>
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<tr>
<td>5. Administration</td>
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<td>6. Distribution</td>
<td>[ ]</td>
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<tr>
<td>7. Items in particular (please specify)</td>
<td>[ ]</td>
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</tr>
</tbody>
</table>

/PAGE 3.....
5. **MARKET** (See Question 7 for Industries and Trades)

Please list in order of importance (i.e. by volume in descending order) the eight main industries and/or trades upon which you consider your company's expansion of sales will depend.

1. .................................................................
2. .................................................................
3. .................................................................
4. .................................................................
5. .................................................................
6. .................................................................
7. .................................................................
8. .................................................................

Comments: (if any) .................................................................

6. **COMPETITION**

Would you kindly indicate the extent to which you consider the following factors play a part in respect of competition in the flexible packaging industry, by using a scale 1 to 10. e.g. 1 = hardly any effect, 5 = a moderate effect, 10 = plays a vital part etc.

1. Selling Prices .................................................................
2. Credit Terms ......................................................................
3. Delivery Dates ....................................................................
4. Quality of Product .............................................................
5. Customer Attachment .......................................................
6. Scale of production ............................................................
7. Size of orders .....................................................................
8. Fixed overheads ..................................................................
9. Technical Knowhow ..........................................................
10. Possession of product patent rights ....................................
11. Other (please specify) ........................................................

.................................................................
7. **INDUSTRIES AND TRADES SUPPLIED**

Would you please indicate, by marking the appropriate block with a cross, the industries or trades which your company supplies with flexible packaging.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Block</th>
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<tbody>
<tr>
<td>Baking</td>
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<tr>
<td>Beverages</td>
<td>☐</td>
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<tr>
<td>Breweries</td>
<td>☐</td>
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<tr>
<td>Building</td>
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<td>Cement</td>
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<td>Chemical</td>
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<td>Clothing</td>
<td>☐</td>
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<tr>
<td>Confectionery</td>
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<td>Retailers</td>
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<tr>
<td>Supermarkets</td>
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<td>Dairy</td>
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<td>Edible Oil</td>
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<td>Explosives</td>
<td>☐</td>
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<tr>
<td>Fertiliser</td>
<td>☐</td>
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<tr>
<td>Frozen Foods</td>
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<td>Horticultural</td>
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<td>Hospitals</td>
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<td>Meat</td>
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<td>Milling</td>
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<td>Wholesalers</td>
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<td>Chain Stores</td>
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<td>Motor</td>
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<td>Oil</td>
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<td>Paint</td>
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<td>Paper</td>
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<td>Wine</td>
<td>☐</td>
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<tr>
<td>Bazaars</td>
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</tr>
</tbody>
</table>

**Other (please specify)**

- ☐
- ☐
- ☐

*********
8. **ANY OTHER RELEVANT COMMENTS**
FLEXIBLE PACKAGING MATERIALS

Paper

Paper is made by depositing matted cellulose fibres from a dilute suspension in water. Almost any vegetable fibre can be used for making paper but the great bulk is produced from wood. The wood is pulped either by special grindstones (mechanical pulp) or by chemical processes (chemical pulp). The dilute suspension of fibres in water is poured on to a moving whip sieve where it is formed into a continuous sheet. The dried sheet is porous and quite permeable to gases and vapours. It can be treated, in the process of manufacture, to have improved wet-strength or grease resistance. It does not form a barrier package by itself but it is a cheap base for barrier coatings and is still the most widely used wrapping material.

Regenerated cellulose film

This is produced from a specially pure wood pulp by a chemical process which takes the individual fibres into solution and then regenerates a transparent film by precipitation through a slot. The material is chemically similar to paper except that it is no longer porous. It is a poor barrier to water vapour, but when dry a good barrier to oxygen. Its water vapour resistance is greatly improved by being coated and is a more economical base for the application of good coating materials than are porous materials such as paper. The coated cellulose films can be sealed together by heat. They are favoured for their ability to run on automatic wrapping machines. Cellulose films are easy to print, and can be given a tear-strip for convenience in opening.
**Cellulose acetate**

Cellulose acetate is the most widely used of a number of cellulose derivatives which are intended to be somewhat less sensitive to water than are paper or cellulose film. It can be formed from solution or by melt-extrusion. It is a poor barrier to water vapour and oxygen, and can be used for vegetables and fruit although perforation is usually desirable. In thicker grades it is rigid enough to be formed into boxes for presentation packs or to be thermoformed.

**Rubber hydrochloride**

This is derived from the latex of rubber trees, the rubber being purified and reacted with hydrochloric acid to give a product which can be liquified by dissolving in organic solvents. Films of rubber hydrochloride can be plasticized (with varying proportions of organic esters). They are then distensible and fairly pervious to water and oxygen so that they can be used to give attractive taut wraps on meat.

**Polythene**

Polythene is synthesized from ethylene, a by-product of the petroleum industry. It combines the chemical properties of a wax with the physical properties of a long-chain polymeric compound, and in a quarter of a century it has risen to the third largest weight of output amongst wrappings. Many grades with specialized properties have been produced in the process. Polythene film is flexible at sub-zero temperatures and suitable for the packaging of quick-frozen foods.

**Polyvinylchloride Film**

This is derived from coal, via acetylene. When polymerized
alone it is infusible but with 5-25% of copolymer a film can be produced. The higher copolymers can only be used as coatings when they confer exceptional resistance to water vapour. Softer copolymers give thicker, self-supporting films which have the same overall order of protection as the thinner coatings, but because of their limpness they are not easy to run on automatic wrapping machinery. Poultry, cheese and processed meat are wrapped in this film.

Nylon Film

Nylon films are prominent among those used in packaging. There are five or six "nylons" which can be produced as films, but of these only Nylon II combines good resistance to water vapour with reasonable workability, and it can be used for hand-wrapping, as bags or pouches or in simple machine-wrapping of bacon or cheese. It can also be used for boil-in-the-bag applications, such as pre-cooked stews or kippers, because it does not allow much odour to escape during re-heating.

Aluminium foil – Metallic foil

The thinnest aluminium foils normally used for packaging are 0.008 mm and 0.009 mm. This very thin foil contains minute perforations (visible if the foil is placed over a light in a darkened room) which allow traces of moisture, odours and gases to pass. Where foil is to be used as a barrier, consideration must be given to the best thickness to avoid excessive perforation or, alternatively, how to combine the foil with something which will block the perforations.

Aluminium foil is not very strong and it is frequently laminated to some stronger material to reinforce it. The cheapest reinforcement is paper and foil/paper laminates
are used very widely. Below about 0.018 mm foil thickness the strength of a laminate is almost entirely due to the film or paper used. On the other hand, in any laminate the barrier properties depend on the foil. Commoner films used for reinforcing foil are regenerated cellulose, cellulose acetate, polyester films, polyamide films, polythene and polypropylene. These films strengthen the foil and protect it against mechanical damage. They also help to block leakage due to pin-holing or perforation of the foil. It is of course of little use to select thick foil for protection if the pack is not sealed for there is far greater water vapour and gas transmission through an unsealed overlap than through the perforations in the foil. Heat sealable films such as polythene and Pliofilm are laminated to or extruded on the foil or sometimes on to a paper reinforcement of foil.

Laminates

No single wrapping possesses all the properties of an ideal wrap when used at an economical thickness. It is natural, therefore, to seek to combine the complementary excellences of two or more wrappings by combining them together. In simple cases, an inexpensive thermoplastic material can be extruded on to a stronger base such as paper, the barrier properties of one complementing the mechanical strength of the other. Such coated papers are sometimes used for packing liquids. In more complicated cases the strength may be contributed by a paper, or a film of cellulose or a polyester, the barrier properties by a thin aluminium foil and heat-sealing by a thermoplastic film. Such complex materials are more expensive to use, partly because of their relatively low yield and partly because of the cost of the adhesive which is necessary to hold the plies together, but they can provide a degree of protection which justifies their use. Very sensitive dry foods, particularly if a long
life is necessary - are well packed in such laminates.

Source: PAINE, F.A. (Editor): "Fundamentals of Packaging"
Published under authority of the Council of the
EXPENDITURE ON PACKAGING MATERIALS (ALL TYPES)

The following table reflects those industries in the South African economy spending the greatest amounts annually on packaging materials. The data is based on the 1967/68 Industrial Census, which is the latest data available.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Expenditure on Packaging (R1000)</th>
<th>% of Total Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foodstuffs -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit and vegetables (fresh and processed)</td>
<td>20813</td>
<td></td>
</tr>
<tr>
<td>Grain and flour products</td>
<td>11345</td>
<td></td>
</tr>
<tr>
<td>Cocoa, chocolate and sugar confectionery</td>
<td>5399</td>
<td></td>
</tr>
<tr>
<td>Condensed milk and milk powder</td>
<td>3963</td>
<td></td>
</tr>
<tr>
<td>Coffee and tea</td>
<td>3815</td>
<td></td>
</tr>
<tr>
<td>Bakeries</td>
<td>3273</td>
<td></td>
</tr>
<tr>
<td>Sugar has</td>
<td>2226</td>
<td></td>
</tr>
<tr>
<td>Meat and meat products</td>
<td>2095</td>
<td></td>
</tr>
<tr>
<td>Fish and fish products</td>
<td>2038</td>
<td></td>
</tr>
<tr>
<td>Margarine and edible oils</td>
<td>1858</td>
<td></td>
</tr>
<tr>
<td>Ice cream</td>
<td>1034</td>
<td></td>
</tr>
<tr>
<td>Animal feeds</td>
<td>1004</td>
<td></td>
</tr>
<tr>
<td>Breakfast foods (instant)</td>
<td>730</td>
<td></td>
</tr>
<tr>
<td>Butter and cheese</td>
<td>702</td>
<td></td>
</tr>
<tr>
<td>Other manufactured food products</td>
<td>5407</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>65702</td>
<td>40,2</td>
</tr>
<tr>
<td>Chemicals and chemical products -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicines, cosmetics and toilet preparations</td>
<td>9959</td>
<td></td>
</tr>
<tr>
<td>Soaps and candles</td>
<td>6167</td>
<td></td>
</tr>
<tr>
<td>Paints, varnishes and lacquers</td>
<td>3545</td>
<td></td>
</tr>
<tr>
<td>Fertilisers</td>
<td>2789</td>
<td></td>
</tr>
<tr>
<td>Other basic industrial chemicals</td>
<td>2587</td>
<td></td>
</tr>
<tr>
<td>Disinfectants and insecticides</td>
<td>1952</td>
<td></td>
</tr>
<tr>
<td>Explosives and carbide</td>
<td>1899</td>
<td></td>
</tr>
<tr>
<td>Polishes</td>
<td>1896</td>
<td></td>
</tr>
<tr>
<td>Oil seed and marine oil</td>
<td>799</td>
<td></td>
</tr>
<tr>
<td>Other chemical products</td>
<td>1079</td>
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<tr>
<td>TOTAL</td>
<td>32672</td>
<td>20,0</td>
</tr>
<tr>
<td>Category</td>
<td>Subcategories</td>
<td>Quantity</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Beverages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spirits and wines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft drinks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>15014</td>
</tr>
<tr>
<td>Non-metallic mineral products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td></td>
<td>3533</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>2548</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>6081</td>
</tr>
<tr>
<td>Textiles, clothing and footwear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hosiery, rayons etc.</td>
<td></td>
<td>3037</td>
</tr>
<tr>
<td>Clothing</td>
<td></td>
<td>2621</td>
</tr>
<tr>
<td>Footwear</td>
<td></td>
<td>1732</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>2720</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>10110</td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>6116</td>
</tr>
<tr>
<td>Leather and leather products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>excluding footwear</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>1093</td>
</tr>
<tr>
<td>Other (VARIOUS)</td>
<td></td>
<td>26754</td>
</tr>
<tr>
<td><strong>TOTAL ALL PACKAGING MATERIALS</strong></td>
<td></td>
<td>163542</td>
</tr>
</tbody>
</table>
### REPUBLIC OF SOUTH AFRICA - 1967/8

**APPENDIX IV**

**PACKAGING COSTS AS A PERCENTAGE OF THE SELLING PRICE OF THE COMMODITY**

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Cost of Packaging Materials (R1000)</th>
<th>Sales value of Output (R1000)</th>
<th>% Packaging costs of Sales Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit and vegetables (fresh and processed)</td>
<td>20813</td>
<td>86796</td>
<td>24.0</td>
</tr>
<tr>
<td>Breakfast foods</td>
<td>730</td>
<td>4223</td>
<td>17.3</td>
</tr>
<tr>
<td>Milk Products</td>
<td>3963</td>
<td>28651</td>
<td>13.8</td>
</tr>
<tr>
<td>Medicinal and other pharmaceutical products</td>
<td>9959</td>
<td>79423</td>
<td>12.5</td>
</tr>
<tr>
<td>Sweets and chocolates</td>
<td>5399</td>
<td>44210</td>
<td>12.2</td>
</tr>
<tr>
<td>Soaps and candles</td>
<td>6167</td>
<td>55807</td>
<td>11.1</td>
</tr>
<tr>
<td>Ice cream</td>
<td>1034</td>
<td>9961</td>
<td>10.4</td>
</tr>
<tr>
<td>Coffee and tea</td>
<td>3815</td>
<td>45844</td>
<td>8.3</td>
</tr>
<tr>
<td>Cement</td>
<td>3533</td>
<td>48314</td>
<td>7.3</td>
</tr>
<tr>
<td>Yeast</td>
<td>276</td>
<td>3823</td>
<td>7.2</td>
</tr>
<tr>
<td>Peanut products</td>
<td>142</td>
<td>2131</td>
<td>6.7</td>
</tr>
<tr>
<td>Fish products</td>
<td>2038</td>
<td>37314</td>
<td>5.5</td>
</tr>
<tr>
<td>Grain and flour products</td>
<td>11345</td>
<td>228844</td>
<td>5.0</td>
</tr>
<tr>
<td>Margarine and edible oils</td>
<td>1858</td>
<td>37514</td>
<td>4.9</td>
</tr>
<tr>
<td>Tobacco and cigarettes</td>
<td>6116</td>
<td>136367</td>
<td>4.5</td>
</tr>
<tr>
<td>Meat and meat products</td>
<td>2095</td>
<td>53568</td>
<td>3.9</td>
</tr>
<tr>
<td>Fertilisers</td>
<td>2789</td>
<td>77479</td>
<td>3.6</td>
</tr>
<tr>
<td>Other food products</td>
<td>4989</td>
<td>32373</td>
<td>15.4</td>
</tr>
</tbody>
</table>

**Source:** Data extracted from the Manufacturing Census of 1967/8 (Department of Statistics) and is the latest available.
<table>
<thead>
<tr>
<th>CHAPTER II : MANAGEMENT ACCOUNTING</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 THE NATURE AND SCOPE OF MANAGEMENT ACCOUNTING</td>
<td>40</td>
</tr>
<tr>
<td>2.2 THE NATURE AND IMPORTANCE OF COST CONTROL</td>
<td>47</td>
</tr>
<tr>
<td>2.3 SOME OF THE PROBLEMS OF COST CONTROL IN THE FLEXIBLE PACKAGING INDUSTRY</td>
<td>53</td>
</tr>
</tbody>
</table>

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APPENDICES

I Factors which give rise to variations in manufacturing costs of flexible packaging.
CHAPTER II : MANAGEMENT ACCOUNTING

2.1 THE NATURE AND SCOPE OF MANAGEMENT ACCOUNTING

2.1.1 Management Accounting Defined

It has been said that "All accounting is for management". This trite statement is no doubt true in some sense and acknowledges the fact that ultimately all business performance is measured in accounting terms and, as such, is the concern of management.

One of the milestones in the contribution of accounting to management has been the development of that branch commonly known to-day as "Management Accounting".

The precise origin of "Management Accounting" in point of time is difficult to determine and the reason for this is due to the fact that "Management Accounting" evolved and developed to meet the growing demands of industry as distinct from commerce.

"The first reference to something like an introduction to management accounting, and hence to the management accountant, came from the chartered side, not from the Institute of Cost and Works Accountants. In October, 1948, the London and District Society of Chartered Accountants arranged a series of lectures on various aspects of the relationship between management and the accountant with some high powered speakers who included Sir Charles Reynold and Mr Lawrench William Robson". (1)

However the wide use and acceptance of the term "Management Accounting" seems to date from 1950.
In November, 1950, the Anglo-American Council on Productivity published a report entitled "Management Accounting", which received much publicity at the time. A committee had been formed in 1948 to investigate the reasons why the productivity of British industry was, admittedly, low by comparison with that of the United States. This resulted in an Accountancy Team being sent to America in April 1950. In its report to the Anglo-American Council on Productivity, the British management accounting team defined management accounting as follows:

"Management Accountancy is the presentation of accounting information in such a way as to assist management in the creation of policy and in the day-to-day operation of an undertaking".

While many other definitions have since been written, the one quoted above probably describes the field as well as can be expected within the confines of a compact statement. The importance of this definition probably lies in the publicity given to the report and as such heralded an official acceptance of the term "Management Accounting".

More recent definitions vary a great deal in regard to the scope of management accounting. Some of these define management accounting in broad terms, such as:

"... all those accounting activities which assist management at all levels and generally enhance the daily running of the business". (2)

again "any form of accounting which enables a business to be conducted more efficiently can be regarded as management accounting". (3)
A modern definition as expounded by the Institute of Cost and Management Accountants, a professional body which has done much to establish management accounting as a profession, defines the subject as follows:

"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 undertaking". (4)

2.1.2 Scope of Management Accounting

Specialist books on the subject of management accounting, in addition to those on standard costing and budgetary control, specify such subjects and terms as financial policy, responsibility accounting, decision accounting, break-even analysis, marginal costing, revaluation accounting, contribution accounting and management information systems as falling within the framework of management accounting. (5)

A more recent tendency has been to include some of the modern techniques of management, such as, Linear Programming, Critical Path Scheduling and Operational Research as being within the sphere of management accounting. (6) One writer has argued the case for the inclusion of work study as being within the scope of management accounting. (7)

It is apparent that there is by no means universal agreement on what constitutes the entire scope of management accounting. This is understandable if one
appreciates that the field of management accounting is an ever widening one and is closely linked to developments in management and to the growing needs of management.

However there appears to be universal acceptance of budgetary control and standard costing as being the keystones of management accounting.

One authoritative writer on the subject states:

"Management Accounting functions largely through operating reports based upon standard costs and budgets compared with actual expenditures". (8)

Further evidence of the fact that standard costing features prominently in the scope of management accounting is expressed in the book "Management Accounting for Profit Control" where it is stated:

"The basic object of management accounting is to facilitate the attainment of enterprise goals. They are met through the application of cost accounting, especially standard cost accounting, and budgetary-control processes which are the major tools of management". (9)

2.1.3 Budgetary Control

Budgetary control is considered to be a dynamic aid to management control when correctly applied and supported by top management.

Budgetary Control has been defined as "the establishment of budgets relating the responsibilities of executives,
to the requirements of a policy, and the continuous comparison of actual with budgeted results, either to secure by individual action the objective of that policy or to provide a basis for its revision". (10)

Another definition stresses the importance of participation by management.

"Budgetary control is a system which uses budgets as a means of planning and controlling all aspects of producing and/or selling commodities or services. Although financially orientated, it requires full recognition to be given to the fact that participation by directors and managers is essential. Budgetary control is not intended to be a purely accounting exercise which bears no relation to managerial decisions and action". (11)

2.1.4 Standard Costs

In the early stages of its history, cost accounting followed the pattern of financial accounting in preparing historical costs, that is, actual costs of production at the end of accounting periods, monthly, quarterly or annually. However developments in industry gave rise to an increase in the variety of products which a firm would produce or in the number of processes through which materials passed. This brought about a need for the ascertainment of product costs and costs at various stages of production so that management could be aware of the profitability or otherwise of their products and whether the costs of processes were economic or not. This information was required prior to and while production took place
and not as a matter of history long after the goods are produced.

The limitations in the usefulness of historical costs were realised as early as the 1920's and particularly in the depression period of the early 1930's.

"The inter-war slump period, with its attendant fierce competition, was the chief factor both here and in the United States of America in spot-lighting these deficiencies and in producing a major development in cost accounting, namely the introduction of standard costs". (12)

Standard or pre-determined costs represent an effort to control costs and to use accounting techniques for that purpose rather than to merely record past history.

There are many definitions of "Standard Costing" of which the following are two:

1. "Standard costing is a system of cost accounting which makes use of pre-determined standard costs relating to each element of cost - labour, material and overhead - for each line of product manufactured or service supplied. Actual costs incurred are compared with the standard costs as the work proceeds, the differences between the two being known as "variances"; these are analysed by "reasons" so that inefficiencies may be quickly brought to the notice of the persons responsible for them, and appropriate action may be taken". (13)
2. "The preparation of standard costs of products and services. A standard cost being a pre-determined 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". (14)

It is interesting to note that the success of standard costing in the United States has been a direct result of the scientific management movement there. In America satisfactory co-ordinating procedure seems to have been arranged between the functions of management accounting and industrial engineering. These functions found common ground in the establishing of standards for material specifications, production times and methods. (15)

Properly applied budgetary control and standard costing are dynamic management tools for the achievement of effective cost control.
2.2 THE NATURE AND IMPORTANCE OF COST CONTROL

2.2.1 Cost Control Defined

The word "control" itself is defined in Funk and Wagnalls - New Standard Dictionary of the English Language as "to exercise a directing, restraining or governing influence over". When applied to the field of cost accounting this definition is particularly meaningful.

"Cost Control" has been formally defined as "The regulation by executive action of the costs of operating an undertaking, particularly where such action is guided by cost accounting". (16)

Another definition is "The employment of management devices in the performances of any necessary operation so that pre-established objectives of quality, quantity and time may be attained at the lowest possible outlay for goods and services. Such devices include a bill of materials; instructions, standards of performance; competent supervision; cost limits on items and operations; and studies, interim reports, and decisions based on these reports". (17)

But even these definitions do not embody all the ramifications of cost control.

Cost control is not exclusively a cost accounting process. There are many factors within an industrial organisation which have a bearing on the effectiveness of cost control. Some of these factors are: production
control, the style or type of management, the systems of communication within the organisation and the organisational structure. However cost accounting methods do play a most important and practical part in the control of costs. Current literature emphasises the fact that cost control is a distinctive objective of management accounting.

"Cost control has as its objective production of the required quality at the lowest cost attainable under existing conditions. It presupposes a plan which is embodied in a set of standards specifying how each job is to be done and what it ought to cost". (19)

Standards are used as methods of measuring the efficiency of production and serve as a means of control in the operation of a management accounting system. The establishment of standard costs is of vital importance in establishing managerial control of costs.

The role of management accounting in respect of cost control can be conveniently classified as (i) after-the-fact cost control procedures and (ii) before-the-fact cost control procedures. (20)

These two classifications may be referred to as corrective control and preventive control. The corrective concept refers to the process of constantly checking current cost performance with planned, budgeted or standard cost allowances and of reporting variances immediately to management so that corrective action may be taken to prevent the recurrence of unfavourable variance from the standard. Attention in
this approach is focussed upon protecting the resources of materials, labour and overheads from being wasted by employees.

2.2.2 A Modern Approach to Cost Control

A noticeable current trend is to direct cost control more toward the concept of preventive control, that is, to adopt various procedural, psychological and physical stimuli to motivate employees to keep costs within those allowed by standards and budgets. It is said that in this approach standard costs and budgets serve as psychological stimulation, motivating employees to work efficiently towards keeping within the standard costs and budgets. This more recent emphasis is that, it is people or employees who should be controlled and that by the control and proper motivation of people, resources will be effectively controlled. [21]

A recent publication on "Management Accounting" in a chapter entitled "Cost efficiency through standard costs" makes reference to this aspect of the subject. "An area of research called behavioural accounting offers the possibility of further insights and understanding. Current beliefs seem to be that standards motivate best when there is valid participation in their establishment, when they are tight but reasonable, when the organisational structure is more democratic than authoritarian". [22]

Support for this approach is made by Professor Rensis
Likert and Stanley S. Seashore, both well known for their research in behavioural science in respect of business organisations. In an article entitled "Making cost control work" of which they are joint authors, they state: "The usual approaches to cost control involve many highly effective and valuable procedures. The solution to achieving low costs and high productivity continuously is not to reject all aspects of current procedures but to develop a system of management which uses these procedures appropriately and in such a manner that co-operating rather than hostile motivations are created among both the supervisory and non-supervisory members of the organisation". (23) The ultimate aim of both of these concepts of corrective and preventive control is the same. In the first instance attention is centred on resource control and in the second and newer concept emphasis is placed on the motivation of personnel to perform well.

Whatever the approach, the careful construction of budgets and the proper determination of standard costs in respect of materials, labour and overheads are a prerequisite to the effective control of cost.

2.2.3 The Importance of Cost Control

In recent years heavy emphasis in management accounting literature has been placed on the fact that cost accounting is an activity which must function in such a way that it produces information which will enable costs to be controlled. It is stressed that this function should so dominate that the furnishing of
cost data for purposes of price determination should play a subsidiary role.

As one authoritative writer on the subject has stated, "A great deal of accounting effort is directed towards cost finding which, while valuable, is only part of the story and the lesser part as far as management is concerned". (24)

These points have been expounded by different writers with the object of drawing the attention of management accountants to the fact that, although cost finding is an important part of their work, they should direct a greater portion of their effort to producing cost information which will assist in the control of costs.

The effective control of costs ensures that products or services are being produced at minimum cost, within the particular firm. It can assist the firm to compete successfully in a competitive market thus furthering the viability of the firm.

When viewed nationally, cost control assumes a position of great economic importance. When widely and effectively applied in industry it can contribute greatly to overcoming the problem of inflation and can play an important role in promoting national prosperity.

2.2.4 The Importance of Cost Control in the Flexible Packaging Industry

In addition to the importance of cost control to the
individual firms in the industry as indicated above, it is of prime importance in a much wider context in this industry.

Flexible packaging as already indicated is used extensively for the packaging of a very wide range of consumer products and notably for a large number of food products. (See Chapter I) Furthermore as the cost of flexible packages is now considered an integral part of the cost structure of these consumer products, it is in the interests of a large section of consumers that increases in the costs of flexible packaging are kept within controllable limits.
2.3 SOME OF THE PROBLEMS OF COST CONTROL IN THE FLEXIBLE PACKAGING INDUSTRY

2.3.1 Complexity of the Manufacturing System

The major problem in relation to cost control in the flexible packaging industry is due to the fact that the industry is a jobbing one. Jobbing industries have been defined as "Those industries producing goods each order for which, or nearly each order for which, has characteristics dictated by the customer which distinguish it from all other orders and which require differences in the method of production". (25)

This definition aptly describes the position in the flexible packaging industry. A significant characteristic of the manufacture of flexible packaging is the non-repetitive nature of the work and the large variety of products. When the variation in job specifications of flexible packages is taken into account the list appears almost endless.

The factors bringing about variations in job specifications and consequently variations in cost are shown in Appendix I.

Appendix I reveals an almost unlimited variation in job specifications brought about firstly by an extremely large range of direct materials, each with its own cost. There is an almost indeterminate number of packaging sizes. There is a lengthy list of manufacturing operations, of which various combinations of processes may be needed to produce a particular
package. The production times consisting of both machine "make-ready" times and machine running times produces yet another variable factor.

Depending on the size of the firm engaged in producing flexible packaging, the number of orders making up the total annual output, varies from about 800 to 4000 per firm per year. When taking into account that an average order consists of two items, the number of jobs produced per firm could vary from about 1600 to 8000 per year, each with its own particular specifications and cost.

2.3.2 Necessity for pre-determined job costs

Although current management accounting literature calls for a priority to be given to cost control as opposed to cost ascertainment, the ascertainment of pre-determined job costs in the flexible packaging industry is essential to economic survival. As a jobbing industry the process of securing an order involves the quotation of selling prices. This necessitates the predetermination of the cost of jobs to enable economic selling prices to be fixed.

The problem here on the one hand is to establish a selling price which will yield a profit and on the other hand not to price the firm out of the market.

In this respect the problem facing the flexible packaging industry differs from those engaged in producing a standard product or standardised products, involving mass production. The selling prices of
these articles are usually fixed over comparatively long periods. These industries have operated the familiar technique of standard costing and budgetary control with conspicuous success. In these industries long-term plans can be made and standards can be established against which performance can be judged with the reasonable certainty that their basic patterns will persist over a relatively long period.

2.3.3 Changes in demand and productive capacity

In the flexible packaging industry demand in terms of customer's needs both as to character and volume are relatively unpredictable. In periods of recession, manufactured stocks cannot be built up because products are "tailor made". This type of product forms approximately 90% of a firm's production. There is a relatively limited demand for non "tailor made" products such as plain paper bags, film bags or plain wrappers commonly referred to as "stock lines". These items are manufactured in batches and placed in the finished goods store, where they await sales. As stock lines are responsible for approximately only ten percent of a firm's output, these standardised lines offer only limited possibilities for increasing plant utilisation when there is a fall off in demand of the non-standardised products.

For this reason no manufactured stocks, that is stocks in significant quantities are available to meet extraordinary demands in boom periods. Changes in demand therefore react very quickly upon the productive capacity of the jobbing industry of flexible packaging.
2.3.4 Manufacturing overheads and plant utilisation

There is in the industry a heavy investment in production machinery which necessitates the employment of a high degree of skilled labour to ensure the efficient use of all machinery. Because of the technical nature of the plant, service departments are required to supply mechanical, electrical and electronic maintenance services, to ensure the smooth running of all productive plant. Other ancillary services which are necessary to ensure efficient production, are ink mixing departments, laboratories, foundries for the preparation of printing rubbers and in some firms a large department for the production of gravure cylinders. A gravure cylinder department is a complete manufacturing unit, involving a lengthy process in the production and etching of gravure cylinders, the average cost of a cylinder being about five hundred rand each. Gravure printing processes generally require from four to ten cylinders, depending on the requirements and the size of the firm. These cylinder costs constitute a basic charge before the commencement of the production of the packaging.

In view of all this, the fixed manufacturing overheads in the industry are high and the effective utilisation of plant is therefore a vital factor in minimising the incidence of these overheads.

All industrialists are faced with the problem of ensuring the fullest use of their productive plant to minimise the effects of overheads. In industries engaged in mass production or producing standard
products, the problem is mainly one of sales or market volume. In flexible packaging with its jobbing character and exceptionally large variety of products, the problem of ensuring a high level of plant utilisation is not merely one of sales volume. It includes the more vexed problem of ensuring the right product mix, that is, the procurement of an assortment of orders for products such that it will result in the fullest use of all plant and therefore in the minimisation of overheads.

In view of this, one of the difficulties that can and does arise in this connection, is for a firm to have a full order book on occasions and simultaneously to have only partial plant utilisation. Ideally, the marketing efforts of the firm should be closely co-ordinated with its productive capacity.

2.3.5 Budgetary Control

As budgetary control is an important aspect of cost control, the preparation of a well constructed and realistic budget is a prerequisite for effective control. Ideally, an annual budget for a flexible packaging company should contain in the conventional form, the total costs of all jobs to be manufactured in the ensuing year.

However in view of the large number of jobs involved and the many variable factors pertaining thereto, any attempt to construct a budget by way of "the sum total costs of all future jobs", would not only be impractical but would prove a futile exercise. Therefore
a more practical approach is needed in which the objectives of budgetary control can be achieved.

2.3.6 Research and Development Costs

Because of the competitive nature of the industry and in order to meet the growing demands of consumer orientated marketing in South Africa, a flexible packaging firm must remain innovative by producing new and improved types of flexible packages. This gives rise to research and development costs. Apart from the control of the extent of these costs, another problem is the manner in which they should be recovered or disposed of.

2.3.7 Implications for Cost Control Procedures

As shown the flexible packaging industry has some difficult and unusual problems in relation to cost control procedures. This is due to the jobbing nature of the industry and the almost endless number of variables involved.

The emerging problem appears to be that of trying to adduce any degree of uniformity or standardisation which will allow for the application of standard costing and budgetary control in the industry.
CHAPTER II: FOOTNOTES


(6) SMALL, J.R. Article : "New Developments in Management Accounting" : The Accountants Magazine : September 1964 p.665. See also:


APPENDIX I

FACTORS WHICH GIVE RISE TO VARIATIONS IN MANUFACTURING COSTS OF FLEXIBLE PACKAGING

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>ITEM</th>
<th>ESTIMATED RANGE OF VARIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small or medium size firm</td>
</tr>
<tr>
<td>TYPES OF DIRECT MATERIAL</td>
<td></td>
<td>Different grades of material</td>
</tr>
<tr>
<td>Cellulose films</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Plastic films</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>Polyethylene</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Nylon films</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Aluminium foil</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Laminations</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Kraft papers</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>Glazed imitation parchment</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Glassine paper</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Grease proof paper</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Miscellaneous papers</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Printing inks</td>
<td>30</td>
<td>50 *</td>
</tr>
<tr>
<td>Lacquers and resins</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Adhesives</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Waxes</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>TYPES OF INDIRECT MATERIAL</td>
<td></td>
<td>Different types of packing materials used for different products</td>
</tr>
<tr>
<td>Packing materials e.g.</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Paper, twine, labels, boxes etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRODUCT SIZES</td>
<td>Variations in measurements</td>
<td></td>
</tr>
<tr>
<td>Bags - two dimensional</td>
<td>200</td>
<td>500</td>
</tr>
<tr>
<td>- three dimensional</td>
<td>250</td>
<td>400</td>
</tr>
<tr>
<td>Pouches</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Wrappers</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Reels</td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>
### TYPES OF MANUFACTURING OPERATIONS

<table>
<thead>
<tr>
<th>Operation</th>
<th>Number of different types of operations within each category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bag making</td>
<td>5</td>
</tr>
<tr>
<td>Bag making and printing (one operation)</td>
<td>12**</td>
</tr>
<tr>
<td>Printing Flexographic</td>
<td>5</td>
</tr>
<tr>
<td>&quot; Gravure</td>
<td>5</td>
</tr>
<tr>
<td>&quot; Densatone</td>
<td></td>
</tr>
<tr>
<td>Lacquering</td>
<td>2</td>
</tr>
<tr>
<td>Laminating</td>
<td>5</td>
</tr>
<tr>
<td>Waxing</td>
<td>3</td>
</tr>
<tr>
<td>Coating</td>
<td>2</td>
</tr>
<tr>
<td>Embossing</td>
<td>4</td>
</tr>
<tr>
<td>Slitting</td>
<td>6</td>
</tr>
<tr>
<td>Sheeting</td>
<td>2</td>
</tr>
<tr>
<td>Guillotining</td>
<td>1</td>
</tr>
<tr>
<td>Handwork</td>
<td>6</td>
</tr>
<tr>
<td>Cylinder engraving</td>
<td></td>
</tr>
<tr>
<td>Foundry work</td>
<td></td>
</tr>
<tr>
<td>Design and Artwork</td>
<td></td>
</tr>
</tbody>
</table>

### PRODUCTION TIMES

- **Machine running times for jobs**: 3 hours to 500 hours
- **Machine make-ready times i.e. Setting up machines for size and colours**: ½ hour to 24 hours

### NUMBER OF ORDERS PER ANNUM

(An order may consist of a number of items or jobs)

<table>
<thead>
<tr>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 - 1500</td>
</tr>
<tr>
<td>3000 - 4000</td>
</tr>
</tbody>
</table>

**Note**

The great variations in direct material are brought about by two main factors, namely:

(i) The different properties possessed by the different materials which are necessary for the special packaging requirements of the product to be packed.

(ii) The differences in the substance of the materials, that is, differences in weights per uniform area.

* The actual range of printing inks used in the industry approaches a thousand but many of them are grouped together for costing purposes.

** Example - different types of bag machines making self-opening bags, flat shape bags, powderproof bags etc.**
<table>
<thead>
<tr>
<th>CHAPTER III : ASPECTS OF BUDGETARY CONTROL IN THE SURVEYED FIRMS</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 BUDGET PREPARATION</td>
<td>62</td>
</tr>
<tr>
<td>3.2 BUDGETS AND COST - VOLUME - PROFIT RELATIONSHIPS</td>
<td>76</td>
</tr>
<tr>
<td>3.3 CONTRIBUTION ACCOUNTING</td>
<td>81</td>
</tr>
<tr>
<td>3.4 PARTICIPATION IN THE BUDGETARY PROCESS</td>
<td>85</td>
</tr>
<tr>
<td>3.5 RESPONSIBILITY ACCOUNTING</td>
<td>88</td>
</tr>
</tbody>
</table>

FOOTNOTES

APPENDICES

I Questionnaire No. 2 - S.A. Flexible Packaging Industry
CHAPTER III : ASPECTS OF BUDGETARY CONTROL IN THE SURVEYED FIRMS

"Omnia praecepi, atque animo mecum ante perregi"

Virgil, AEneID 6,105

"I have anticipated all things and transacted them all before hand in my mind"

3.1 BUDGET PREPARATION

Introduction

"A carefully prepared budget is the best possible standard against which to compare actual performance and it is increasingly being used for this purpose". (1)

One of the prerequisites for sound budgeting is that, the budget takes account of all relevant data, both internal and external. In this respect the practice is growing of performing pre-planning prior to the budget preparation, in order to determine the broad assumed operating plan of an enterprise. This pre-planning is developed from two basic sources, namely the company objectives set by top management and environmental factors which include trends in demand and potential in relation to economic trends.

The productivity Report on Management Accounting published by the Anglo American Council on Productivity in 1950 made reference to American practice as follows:

"The fixing (preparation) of budgets is very closely allied to detailed forecasting based on market research. The
normal method is to forecast for existing products the total demand and the company's estimated share in the potential market. In arriving at the estimate, population and income statistics and field surveys are used to supplement the company's knowledge of the market and the general economy of the country. Many outside sources of information are also used.

As soon as the sales forecast is complete, it is passed over to the controller's department who build up financial budgets and forecasts, balance sheets and profit and loss accounts and link these with the production budgets. Some companies assume several different sales volumes and budget a balance sheet and profit and loss account for each level.

According to the above statement it is American practice to make use of business forecasting prior to the preparation of the budget, thus acknowledging the fact that the main function of business forecasting is to decrease the risk attendant on the uncertainty of the future and as such business forecasting is a valuable aid to budgeting.

Another requirement for the preparation of a budget is very often the use of a budget committee. This assists in the preparation of the budget and in the co-ordination of the separate budgets of the various organisational units.

In some instances budget preparation may be greatly facilitated by the use of a budget manual. Such a manual would cover the objects behind the introduction of the system, the practical arrangements for its installation and the dates by which the various estimates are to be prepared and would fix the responsibilities for the preparation and administration of the budget.
If any key or limiting factors exist at the time of preparing the budget, they should be taken account of in the budget, for the reason that actual performance during the budget period, will be largely governed by them.

Variations in the volume of activity have a significant effect on cost behaviour. If cost-volume relationships can be reflected in a series of budgets relating to different levels of activity, it can greatly assist management in budgetary planning and in the controlling of cost.

For budgetary and cost control to be effective it is essential that responsibility be assigned to persons who influence particular costs and consequently these persons should be accountable for any deviation from their budgeted cost.

Although the budget preparation process is not the mechanism through which most major decisions are made, budgeting is both an accounting and a management process and as such "a successful budgetary system must have the support of top management, whose cost consciousness is fundamental to effective cost control". (5)

3.1.1 Budget Preparation in Firms

Firms in the survey

Eleven of the twelve firms included in the survey supplied answers to the questionnaires dealing with budgeting and costing matters. (See Appendix I) These eleven firms are responsible for over eighty per cent of the turnover in the industry. All these firms indicated that they make use of a system of budgetary control.
All eleven firms reported that they prepare short-term operating budgets covering a period of one year. The period in all cases was the financial year.

Only seven firms indicated that their operating budgets were broken down into monthly or four-weekly periods for the purposes of control.

Eight firms stated that they also prepare long-term budgets with the periods varying from two to five years. In discussion with some executives in the industry it was ascertained that the long-term budgets in most of these firms, related mainly to capital expenditure. However, two firms produce projections of sales and production for three years ahead.

Kinds of Budgets Prepared by Firms

<table>
<thead>
<tr>
<th>Budgets</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>11</td>
</tr>
<tr>
<td>Material Consumption Costs</td>
<td>11</td>
</tr>
<tr>
<td>Manufacturing Overheads</td>
<td>11</td>
</tr>
<tr>
<td>Plant Utilisation</td>
<td>9</td>
</tr>
<tr>
<td>Labour Costs</td>
<td>11</td>
</tr>
<tr>
<td>Total Production Costs</td>
<td>10</td>
</tr>
<tr>
<td>Administration expenses</td>
<td>11</td>
</tr>
<tr>
<td>Selling expenses</td>
<td>10</td>
</tr>
<tr>
<td>Distribution expenses</td>
<td>10</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td>10</td>
</tr>
<tr>
<td>Net Profit</td>
<td>10</td>
</tr>
<tr>
<td>Variation in Stock levels re Work-in-progress and Finished Goods</td>
<td>9</td>
</tr>
</tbody>
</table>
Cash i.e. short-term covering receipts, payments and balances to finance annual operations
Purchasing
Research and Development
Capital Expenditure
Capital Employed
Balance Sheet - Assets & Liabilities
Master
Budget on "fixed" or "static" principle
Application of flexible budgets

Table 1 shows that most of the firms prepare a full range of budgets covering all the operational areas of their business and including balance sheet items. Two firms do not prepare budgeted balance sheets or plant utilisation budgets. All firms indicated that they incorporate their various functional budgets into a master budget.

Fixed and Flexible Budgets

It may be noted that only two firms prepare their budgets on the flexible principle and the remaining nine firms prepare their budget on the "fixed" or "static" principle. The majority of these nine companies indicated that they would revise their "fixed" budget at some stage during the budget period, if changed circumstances indicated that the actual level of activities would differ greatly from the budgeted level of activities.

In this respect the following comments were made by three of these companies.
(1) We review and project quarterly for the year against budget.

(2) Comprehensive "forecasts" (distinguished from budget) are prepared quarterly for the remainder of the budget period.

(3) We would only alter our budget under exceptional circumstances.

3.1.2 Some Procedures in Firms Prior to the Preparation of Budgets

Assessment of the economic environment prior to budget preparation

The majority of firms do plan and make some kind of planning premises for assessing the economic environment in which they operate and these plans then lead to budgets. The assessment of the economic environment can be carried out in different ways but the answers received seem to indicate that the majority of the surveyed companies use, for gaining this information, various economic publications, as follows:

<table>
<thead>
<tr>
<th>Publications consulted</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Reviews of Commercial Banks</td>
<td>8</td>
</tr>
<tr>
<td>Reports of S.A. Reserve Bank</td>
<td>4</td>
</tr>
<tr>
<td>Reports issued by the Bureau of Economic Research (University of Stellenbosch)</td>
<td>9</td>
</tr>
<tr>
<td>Population Census Report</td>
<td>2</td>
</tr>
<tr>
<td>Publications of the Department of Census and Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Trade Journals</td>
<td>10</td>
</tr>
<tr>
<td>Other economic publications</td>
<td>9</td>
</tr>
</tbody>
</table>
One firm stated that all the publications were read throughout the year but were not specifically used in budget preparation. Another firm reported that they only took account of the "general climate".

Yet another company stated that prior to budgeting they make a study of a special publication called "Trends" - a statistical analysis of economic trends in the South African economy - published monthly by the Bureau of Economic Research of the University of Stellenbosch. This publication, it was pointed out, has the particular advantage of containing a great deal of relevant economic data both in respect of the short-term and long-term trends in the economy.

All eleven firms indicated that prior to the preparation of their budgets, a study was made of the future trends of the industries to which their company supplied flexible packaging. Six of the firms indicated that they did this on a systematic basis and the remaining five firms reported that they did this on a non-systematic basis.

Methods used to establish the estimated level of operations

In initially trying to establish the estimated level of operations for the future budget period, firms make use of the following main methods, in a greater or lesser degree.

A. Sales Staff Method i.e. members of the sales staff play an active role in compiling a Sales "Estimate" or forecast for the budget period in question. The Sales Budget used being a refinement of the Sales "Estimate" or Forecast.
B. The Statistical Method i.e. use is made of trends, projections and correlation analysis, particularly between sales and economic indicators and statistical assessment of competition is made.

C. Group Executive Action i.e. Top Managers of the Company, such as finance, production, marketing and administration managers act together to project sales on the basis of group opinion, use being made of their comprehensive knowledge.

The survey revealed the following:

**TABLE 3**

<table>
<thead>
<tr>
<th>Sales Staff Method</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes fullest use of this method</td>
<td>8</td>
</tr>
<tr>
<td>Makes only partial use of this method</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Statistical Method</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes fullest use of this method</td>
<td>2</td>
</tr>
<tr>
<td>Makes only partial use of this method</td>
<td>7</td>
</tr>
<tr>
<td>Does not make use of this method</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group Executive Action Method</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes fullest use of this method</td>
<td>6</td>
</tr>
<tr>
<td>Makes only partial use of this method</td>
<td>2</td>
</tr>
<tr>
<td>Does not make any use of this method</td>
<td>3</td>
</tr>
</tbody>
</table>

One firm mentioned that their main method is to request projections from their customers of their flexible packaging requirements and then they anticipate their own share of such requirements. Another firm specifically mentioned that after the sales staff had prepared the budget it was reviewed by group executives.
3.1.3 The Procedure for the Preparation of a Sales Budget in a Particular Firm

One of the firms interviewed indicated that they made the fullest use of the sales staff method in preparing sales budgets and appeared to have a well established procedure for constructing these budgets.

The following is an outline of the procedure followed:

1. The top management, consisting of the managing director, the marketing and finance directors, assesses the general market situation and current trends. Thereafter the managing director sets guide lines for a forecast of sales.

2. Taking account of the guide lines set by top management, the marketing director and senior members of the sales staff prepare a forecast of sales for the ensuing budget period. They do this by referring firstly to the analysis of actual sales for the past twelve months. This analysis covers various categories of flexible packages. The categories relate primarily to the basic construction of the packages. Further sub-classifications exist which relate to aspects of the printing. For example, "printed" or "pre-printed" denoting that the package is printed simultaneously with the construction operation or prior to the construction operation. In other cases the name of the raw material used, forms a dominant part of the product classification. This firm has over eighty such product classifications. A portion of this analysis is shown in Illustration 1 p. 71.
<table>
<thead>
<tr>
<th>Product Code</th>
<th>Product Analysis</th>
<th>100 Kg</th>
<th>Average price per 100 Kg R</th>
<th>Forecasted / Budgeted Sales Value R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-opening Satchels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flat and Satchel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bank Bags</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pouches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plain</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Film Bags</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plain</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wrappers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Printed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wrappers - Waxed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Printed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. The senior members of the sales staff forecast sales for each product group in the analysis. This is achieved by:

(a) Forecasting the weight of sales for each product group, the unit of weight used being 100 kilograms, and

(b) forecasting the average price per 100 kilograms for each product group.

(c) As a result of (a) and (b), the forecasted sales values for each group are determined. Consequently the total forecasted weight and sales value for the budget period are ascertained.

4. Any new developments indicated by top management, such as new products, are brought into account in the forecast.

5. This sales forecast is then adjusted in respect of any constraints that may be imposed such as the productive capacity or working capital.

6. The adjusted sales forecast is reviewed by the top management and as a result of this, further adjustments may be made to this forecast. The resultant forecast becomes the sales budget.

3.1.4 Organisation for Preparation of Budgets

Responsibility for Preparation of the Budget

Nine firms indicated that the top executive such as the managing director or general manager was primarily responsible for the preparation of the budget. In the remaining two firms the company secretary and departmental
managers respectively were primarily responsible for the preparation of the budget.

Use of Budget Manuals

Only three firms stated that they made use of a budget manual. One other firm stated that "a critical path schedule" was issued to all those concerned in the preparation of the budget, together with a set of explanatory notes.

Use of Budget Committees

Only three firms make use of budget committees. These committees consist of four, five and six members respectively. All members of these committees possess managerial status and represent the main sectors of the firm, namely production, marketing and finance.

The Role of Top Management

Ten firms in the survey indicated the following roles played by their top management, in the preparation and organisation of their budgets.

1. Scrutinises, accepts or rejects proposed budgets.
2. Fully involved in the final preparation.
3. (a) Provides critical assumptions such as wage and salary policies, forecasts etc.
   (b) Sets performance standards such as return on assets and investments.
   (c) Monitors budget assumptions and consolidates the budget.
   (d) Monitors performance.
(e) Variance analysis.

4. A very active role - weekly participation.

5. Fully involved in the final preparation.

6. Exercises ultimate authority and powers of censorship in budget preparation and subsequent monitoring and control.

7. Monitoring of sales, production, raw materials and burden expenses. The setting of key objectives and development projects.

8. Full role.

9. Specifies objectives in the form of the return on investment required from each profit centre. Analysis and approval of individual and consolidated budgets.

10. (a) Assesses the general market situation, trends and set guide lines.

(b) Sets objectives in respect of profit/sales and profit/capital employed ratios. Reviews against own feel for probable result. Reviews against actuals and sets revised targets for key areas, if necessary.

3.1.5 The Application of Price Trends in Budgets

If cognisance is taken of the fact that sales values, material, labour and certain overhead costs are determined in terms of the equation "quantity x price = value or cost", then although simple in concept, it is of major importance in the construction of realistic budgets.
Sound budgeting requires that inflationary trends should be reflected in budgets. This may be best achieved by applying price trends to the relevant budgeted quantities.

The following is an analysis of the number of firms and types of budgets for which quantum factors are first established and to which prices or rates and their trends are subsequently applied to determine their budgeted cost or value.

<table>
<thead>
<tr>
<th>Types of Budgets</th>
<th>Number of firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>7</td>
</tr>
<tr>
<td>Material</td>
<td>3</td>
</tr>
<tr>
<td>Purchasing</td>
<td>1</td>
</tr>
<tr>
<td>Labour</td>
<td>4</td>
</tr>
<tr>
<td>Production</td>
<td>2</td>
</tr>
<tr>
<td>Plant Utilisation</td>
<td>1</td>
</tr>
</tbody>
</table>

Nine firms indicated that they endeavoured to ascertain price trends for the purpose of budget construction. Two of these firms do this by carrying out in-depth studies of price trends. Seven firms reported that they only made general observations of current price trends. The remaining firms gave no indication of their practice as regards price trends and their budgets.
3.2 **BUDGETS AND COST - VOLUME - PROFIT RELATIONSHIPS**

3.2.1 **Introduction**

Many factors cause changes in costs but one of the most significant causes of variation in costs, is a change in the volume of activity. An understanding of the relationship between cost, volume and profits and the probable effect that any change in sales volume would have on costs, should be extremely helpful to management in the budgetary planning stage and in the process of cost control.

Two authoritative writers on the subject state that "If cost control has been poor, then the relationship between volume and costs will be difficult to detect and the margin of error will be high". (6)

In an article entitled "Cost-Volume-Profit Analysis in Planning and Control" (7) the co-authors, Professors Crowningshield and Battista, state that "In planning, it can be used to determine whether efforts would be better directed toward the reduction of fixed costs or of variable costs, or whether the effort should be exerted to increase volume". They further emphasise the aspects of cost control by stating that "as a control device, cost-volume-profit analysis can be used to detect the insidious upward creep of costs that might otherwise go unnoticed". (8)

Cost-Volume-Profit analysis requires that costs should be divided into fixed costs (also referred to as period costs) (9) and variable costs (also referred to as direct costs). (10) This separation of costs into
fixed and variable categories is the principal characteristic of all cost-volume-profit analysis.

Where the variation of costs with volume has not previously been studied, a substantial amount of analysis of past records and statistics may be necessary, to determine the behaviour of costs in relation to volume. Some systematic methods exist to assist in this task e.g. use of scatter graphs, regression analyses and high - low methods.

Cost-volume-profit analysis may be approached in different ways, each having its own area of usefulness for cost control.

Two of these approaches are:

(1) Budgets expressing cost-volume-profit relationships
(2) The application of contribution accounting in budgeting.

3.2.2 Application in Firms in the Survey

Eight firms in the survey indicated that in the presentation of their budgets they gave effect to cost-volume-profit relationships. This was noticeably in contrast to the fact that only three firms had indicated that they apply flexible budgeting.

Only one company explained, by way of comment on their questionnaire, the significance of their giving effect to cost-volume-profit relationships in their budget presentation. It was explained that they did so "... in so far as "Best" and "Worst"
possible situations are developed from the budget model".

A representative of this company elaborated upon their procedure by explaining that initially a budget is prepared by the "Sales Staff Method" (See p. 68) This is followed by the preparation of two further budgets, one of which is prepared on a reduced sales volume in relation to the initial budget and the other on an increased sales volume. Certain assumptions are made in respect of these two budgets. The assumptions are based in the first case on a pessimistic outlook and secondly on an optimistic outlook.

Examples of some of the pessimistic assumptions quoted are:

(a) that due to increased competition generally there would be a fall off in turnover of x%;

(b) that certain large orders would not materialise due to the likelihood of competitors obtaining these orders;

(c) that market developments would bring about a change in the type of packaging required for certain products e.g. a change from flexible packaging to rigid plastic containers;

(d) that further import control restrictions were anticipated and this would curtail turnover.

Examples of some of the optimistic assumptions are:

(a) that the development of new products would bring about increased turnover;

(b) that in anticipation of their sales organisation
becoming more effective, the company would increase their market share of the flexible packaging market;
(c) that because of newly gained technical advantages greater turnover would result.

All three of the above mentioned budgets are reviewed by the senior executives, with cognisance being taken of variations in the levels of costs, sales and profits. As a result of the senior executives co-ordinated views which take account of plant capacity and market possibilities, a desired level of activity is decided upon. Thereafter, a detailed budget is prepared on this basis.

This firm clearly follows the principle of separating their fixed and variable costs in their budgets. They define their variable costs as "raw materials, direct labour, power and distribution".

It was further stated that the size of over-all fixed costs is critically examined each year when viewed in relation to the budgeted volume.

In another of the companies interviewed on this aspect, a representative stated that they initially prepare two or three budgets and finally prepare an "acceptable" budget based on their findings of the earlier ones. Acceptability in this case is based on a desired amount of budgeted profit.

An executive in another company stated that it was their practice to first prepare an optimistic budget. Thereafter, this budget is scaled down to a more
realistic position, that is, in terms of their actual expectations during the budget period.

Five firms indicated that they relied upon the relationship between causal factors and variable costs in their companies, for budgeting their variable overheads. Only one company reported that they made use of any specialised technique, namely scattergraphs for determining their budgeted variable overheads. The remaining firms gave no indication of the method used for determining their budgeted variable overheads.
3.3 CONTRIBUTION ACCOUNTING

3.3.1 Introduction

The concept of contribution accounting is described in management accounting literature in different terms, such as contribution margin or analysis, direct costing, variable costing, marginal costing or analysis including an expression which has found favour in the United States, namely "out of pocket costs". (11)

All these types of costs refer to costs that can be directly associated with a product or segment of the business or costs that will not be incurred if a project is not undertaken.

The theory invoked in supporting contribution accounting is that in an established enterprise there are fixed overhead costs which in the short term, will not be affected by changes in the volume of production or sales. It is also contended that the majority of fixed overhead costs cannot be assigned or allocated to segments of a business with any degree of equitableness, consequently the only reliable measure of effectiveness of a segment of a business is the contribution made to the fixed overhead costs. The contribution is the income less the direct costs incurred.

An additional benefit to be derived from this approach is that the process of classifying costs into direct and period categories also helps to strengthen control over costs. (12)
Frederick J. Muth points out that:
"This separation brings an understanding of expense behaviour to the production manager, the industrial engineer, and the sales manager, far beyond their experience in developing the flexible budget. The examination of an expense item for classification in the proper category forces investigation as to its actual need and amount. Expenses which have been accepted over the years as necessary at certain activity levels receive far more careful study before they are allowed because they are looked at in a new perspective." (13)

3.3.2 Application in the surveyed firms

Eight firms in the survey indicated that they gave effect to the concept of "Contribution Accounting" in their costing and budgetary systems. The remaining firms indicated that they did not apply "Contribution Accounting" principles.

In discussions with representatives of some companies which applied "Contribution Accounting", representatives explained that their main reason for its use was that it offered distinct advantages over their previous methods which were based on the principles of full absorption costing.

An executive in one of these companies considered that one of the main advantages which they derive from the contribution approach, is that it enables them to act more effectively in respect of price competition. The meaning of this statement is made clear in Illustration
2 (p.84) which shows the type of form used by this company for the costing and quoting of selling prices of enquiries received.

With reference to Illustration 2, it was explained that the company normally based their selling prices on total costs. However, in some cases of aggressive competitive pricing, the company, in order to ensure the fullest utilisation of their plant, quoted prices based on the total direct unit costs rather than on the total unit costs. The total direct unit costs were considered the critical point in pricing, that is, the lowest possible price that could be quoted. In these circumstances the company was usually able to secure orders which yielded a contribution to, at least, the fixed overheads, thus helping to minimise the incidence of these overheads.

The representative of another company interviewed stated that his firm applied the principles of contribution accounting throughout their budgetary and costing systems. This, it was explained, applied to their product costs, their budgets and to their monthly statements of costs, sales and profits.

This company also referred to the aspect of competitive pricing. However, they considered that data showing the relative contributions of their products or product groups was the main advantage which they derived from their application of contribution accounting principles.
### Illustration 2

- **PREDETERMINED PRODUCT COST**

<table>
<thead>
<tr>
<th>Customer</th>
<th>Quotation No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Specifications</td>
<td>Date</td>
</tr>
<tr>
<td></td>
<td>Delivery Date requested</td>
</tr>
</tbody>
</table>

#### Quantity

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Quoted Selling Price unit per</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>COST ITEM</th>
<th>Total Cost</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Materials</td>
<td>R - c</td>
<td>R - c</td>
</tr>
<tr>
<td>(Product Materials)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Art work. Blocks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Labour and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Factory Overheads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Machine Processes

- MP<sub>1</sub> Estimated Production Hours x M.H.R.
- MP<sub>2</sub> " "
- MP<sub>3</sub> " "

#### Direct Factory Cost

- Direct Selling Costs
- Direct Delivery Costs

#### Total Direct Costs

#### Sales Value / Price

- Contribution
  - P/V ratio i.e. \( \frac{\text{contribution}}{\text{sales value}} \) %
- Fixed overheads allocated

#### TOTAL COSTS

#### Net Profit

- % Net Profit to Sales
3.4 PARTICIPATION IN THE BUDGETARY PROCESS

3.4.1 Introduction

Modern literature (14) based on extensive research reflects the view that there is a tendency to over-emphasise the mechanical aspects of the budgetary process and expect it to work without regard to the personal relationships that exist.

Dr Chris Argyris (15) well known for his writings in human relation aspects of budgeting expresses the position very clearly, when he states that "Budgets are accounting techniques designed to control costs through people".

In a significant field study of human problems in budgeting, Dr. Argyris reports that the major problem in obtaining participation in the making of a budget is the problem of getting an acceptance of a budget by all employees concerned with performance, in relation to that budget. He advises that if top management executives are going to use participation then they should give the concept their full practical support. In addition he points out that budgets should not be used as pressure devices. (16)

The call for participation in the budgetary process is wide-spread in accounting literature. (17) Most management writers and management accountants believe that employee initiative, performance and morale are increased with employee participation.
Another writer on the subject expresses the view that participation must not be confined to those at senior managerial level only. "The need for the involvement, commitment and not the least, the participation of the lower members of the organisation is viewed as a vital force." (10)

Hopwood states that the value of participation in these circumstances does not depend on producing a feeling of participation; it depends upon the activity of participation itself. (19)

3.4.2 Application in the surveyed firms

In response to a question on the extent to which human relation techniques are applied to develop a method for obtaining truly active participation in their budgetary control process, seven firms indicated that they apply human relations techniques and the remaining four firms stated that they did not.

However, in response to a question requesting a description of the system of communication in their budgetary process, two of the seven firms who affirmed that they apply human relations techniques, seemingly confine their communications of budget matters to three senior managers only. In view of this, the position in these firms may perhaps be best described as pseudo-participation.

One firm stated that they did not confine their application of human relation techniques to the budgetary control process but apply human relation techniques throughout their organisation.
Of the firms interviewed which affirmed their application of human relations for active participation in budgetary control, two firms confined their meaning of participation to members of their budgets committee.

Another firm interviewed on this aspect, clearly revealed that people at various levels in the company were truly involved in participating in the budgetary process. The top executive of this company explained that he and his company subscribed to a management philosophy which he described as participative management. This, it was explained, referred basically to the type of relationship that existed between superiors and subordinates in his organisation.

In elaborating on this the executive explained that relationships between superiors and subordinates were informal rather than formal and employees were made to feel free to communicate with their superiors. Furthermore, there was effective recognition of the importance of each employee to the organisation, all of which, it was strongly felt, facilitated and made budgetary control more effective. Employees at different levels took part in the construction of the various budgets and in the review of variances. An example of this was when compiling production budgets, machine operators were often consulted as to their opinions on machine outputs and material wastage. At a later stage they took part in variance analysis discussions relating to machine outputs and the use of material.
3.5 RESPONSIBILITY ACCOUNTING

3.5.1 Introduction

As explained in the preceding section, for cost control to be effective budgets must be integrated into a system of people involvement supported by a system of performance reporting.

Some years ago Arthur Andersen and Company, an international firm of public accountants and management consultants, encountered the problem of responsibility accounting. They made a study of the problem and the following is an excerpt from a report on the method they advocate as a result of their study.

"This new approach to accounting and reporting is the development of an accounting system designed to control expenditures by directly relating the reporting of expenditures to the individuals in the company organisation who are responsible for their control. This system results in the preparation of accounting statements for all levels of management, designed primarily so that they can be effectively used by the operating people as a tool in controlling their operations and their costs.

This approach also makes possible the operation of a good budget system. No budget system is fully effective unless it is built around one basic philosophy, namely that each responsible individual in an organisation must feel that the budget is his budget and not something forced upon him which he might feel is unrealistic and unworkable. Unless the responsible individual does feel that it is his budget, he will only make a superficial attempt to live within it or use the information as a
means of controlling his operations.

Now if one will accept this philosophy in his approach to budgeting, one more step must be taken to complete the picture. One must put the reporting of expenditures (cost accounting) in phase with the budget performance responsibility, which is another way of saying that expenditures must be reported on the basis of where they were incurred and who had responsibility for them. Hence comes the term responsibility accounting" (20).

According to the writer of the above article responsibility accounting in effect personalises responsibility for budget and cost data. In applying the concept, each supervisory area or other type of identifiable unit in the organisation is charged only with costs for which it is responsible and over which it has control. The manager or supervisor in charge of the area or unit is given authority to incur costs in respect of his area of operations and is consequently held responsible for any deviations from his budget.

In this context a cost within a given time span is considered controllable by an individual if it is directly affected by his decisions, regardless of how the cost is actually accounted for within the data system. (21)

Horngren states that "responsibility accounting has a natural appeal because it specifies a boundary of operations and distinguishes between controllable and uncontrollable costs". (22)

Horngren (23) however also points out that there are
practical difficulties in deciding whether an item is controllable or uncontrollable and that an item might be controllable in whole or part. He also refers to the influence of the time period in determining whether a cost is controllable or not and states "if the time period were long enough virtually all costs would be controllable by some one in the organisation". (24)

Furthermore, he emphasises that in the interests of controlling costs "accountants must grapple with this problem of attaching responsibility for costs even though their approaches are often coarse". (25)

For responsibility accounting to be effective it is essential that the areas of responsibility within an organisation should be clearly defined and for the organisational relationships to be well established. (26) An organisational chart can help to achieve this.

In as much as the backbone of any responsibility accounting system is the organisation chart of the company, an organisation chart of the imaginary A.B.C. Manufacturing Company is shown in Illustration 3 below.
ILLUSTRATION 3

A B C Manufacturing Company

President and general manager

Vice-president of sales

Personnel manager

Vice-president of production

Chief engineer

Vice-president of finance

Advertising

Salesmen

Service

Maintenance

Production control

General superintendent

Inspection

Receiving, shipping, stores

Hand screw machine

Automatic screw machine

Assembly

Drill press

Punch press

Plating

Heat treating

Controller

Treasurer

General accounting

Cost and payroll

Model shop

Engineering and drafting


The above chart illustrates the various organisational relationships, together with the areas and levels of responsibility for a hypothetical multiproduct metal manufacturing firm with an annual sales of approximately $4,000,000 and some 300 employees.

If cost and organisational responsibilities are linked and coordinated they become an effective means of cost control. The following chart in Illustration 4 shows how this can be achieved.
ILLUSTRATION 4

ORGANIZATION CHART

RESPONSIBILITY ACCOUNTING REPORTS

XYZ COMPANY CONTROLLABLE COST REPORT

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central corporate</td>
<td>$350,000</td>
<td>$340,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Marketing</td>
<td>$350,000</td>
<td>$340,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Production</td>
<td>$500,000</td>
<td>$520,000</td>
<td>$(20,000)</td>
</tr>
<tr>
<td>Finance</td>
<td>$500,000</td>
<td>$520,000</td>
<td>$(20,000)</td>
</tr>
</tbody>
</table>

PRODUCTION DEPARTMENT CONTROLLABLE COST REPORT

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common production</td>
<td>$350,000</td>
<td>$340,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Plant 1</td>
<td>$350,000</td>
<td>$340,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Plant 2</td>
<td>$75,000</td>
<td>$72,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>Plant 3</td>
<td>$350,000</td>
<td>$340,000</td>
<td>$10,000</td>
</tr>
</tbody>
</table>

PLANT 2 CONTROLLABLE COST REPORT

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant-wide costs</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
<tr>
<td>Painting</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
<tr>
<td>Assembly</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
<tr>
<td>Drilling</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
<tr>
<td>Total</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
</tbody>
</table>

DRILLING DEPARTMENT CONTROLLABLE COST REPORT

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
<tr>
<td>Labor</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
<tr>
<td>Overhead</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
<tr>
<td>Total</td>
<td>$5,000</td>
<td>$5,200</td>
<td>$(200)</td>
</tr>
</tbody>
</table>

Source: Don. T. De Coster and Eldon L. Schafer
The above illustration shows a simplified organisational chart indicating the relationship of the different levels of responsibility to that of cost responsibility. The cost reports show the controllable costs at each level. As the reports are prepared for each higher level in the organisation, costs are summarised for the subordinates' areas of responsibility.

Lynch (27) summarises the application of responsibility accounting by stating that it does not involve a drastic change in accounting theory or principles. It is, he declares, for the most part a change in emphasis from product cost to the cost control aspects of accounting wherein the statements to management emphasise the control of costs. This he states can be achieved by reporting and summarising the statements on the basis of "who did it" before they are adjusted and blended for product cost purposes to obtain the conventional financial statements.

3.5.2 Application in the surveyed firms

Seven firms in the survey indicated that they apply the concept of "Responsibility Accounting" to their costing and budgetary systems. The remaining four firms do not do so. A representative of one of the companies interviewed explained that they regarded sales, production and administration as their key areas of operation and the managers (or directors) in charge of these functions were responsible to the managing director for the costs incurred in their respective spheres of control. It was further explained that all three managers responsible for the above areas, together with the managing director drew up the budget.
Each manager was responsible for the construction of his particular budget.

Another company indicated that they applied responsibility accounting by stating simply that "responsible individuals down the line each have a computer "print out" of the budget relating to their areas of responsibility. At the same time they receive a report of "the actuals" on a monthly basis, which is discussed monthly on a "monthly" and "year to date" basis.

An executive of another company interviewed stated that they were still in the process of developing responsibility accounting and had drawn up a chart with three main headings classifying performance, the responsibility centre and persons responsible. This is shown in Illustration 5 below.
ILLUSTRATION 5

<table>
<thead>
<tr>
<th>Performance Factor</th>
<th>Responsibility Centre</th>
<th>Person Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Volume</td>
<td>Sales Department</td>
<td>Sales Manager, Area Managers, Salesmen</td>
</tr>
<tr>
<td>Selling Prices</td>
<td>Sales Department</td>
<td>Sales Manager</td>
</tr>
<tr>
<td>Selling Costs</td>
<td>Sales Department</td>
<td>Sales Manager</td>
</tr>
<tr>
<td>Total Production Output</td>
<td>Manufacturing</td>
<td>Production Manager</td>
</tr>
<tr>
<td>Production Departments</td>
<td>Production Department</td>
<td>Departmental Managers</td>
</tr>
<tr>
<td>outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Production</td>
<td>Manufacturing</td>
<td>Production Manager</td>
</tr>
<tr>
<td>overheads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Departmental Production</td>
<td>Production Department</td>
<td>Departmental Managers</td>
</tr>
<tr>
<td>overheads</td>
<td></td>
<td>Foremen</td>
</tr>
<tr>
<td>Material Usage</td>
<td>Production Department</td>
<td>Departmental Managers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foremen</td>
</tr>
<tr>
<td>Purchasing</td>
<td>Purchasing Department</td>
<td>Chief Buyer</td>
</tr>
<tr>
<td>Material Prices</td>
<td>Purchasing Department</td>
<td>Assistant Buyer</td>
</tr>
<tr>
<td>Capital Costs</td>
<td>Top Management</td>
<td>Managing Director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Board of Directors</td>
</tr>
</tbody>
</table>

The actual results are compared monthly with the budgeted data. In analysing variances, discussions were held with the persons responsible for them, to establish the cause for any variance from the budgeted data. The corresponding corrective action was also then decided upon.

The representative of yet another firm interviewed explained that they applied responsibility accounting as follows:
1. Weekly meetings are held by the production manager with the foremen in charge of the various manufacturing departments. Discussions take place covering the previous weeks operations. The data discussed is shown below in Illustration 6.

**ILLUSTRATION 6**

**WEEK ENDING . . . . . . . . . . . .**

<table>
<thead>
<tr>
<th>Department / Factor</th>
<th>Budget</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department A</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume Factor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production output</td>
<td>Tonnes</td>
<td>Tonnes</td>
<td>± Tonnes</td>
</tr>
<tr>
<td>Machine Hours for each machine</td>
<td>Hours</td>
<td>Hours</td>
<td>± Hours</td>
</tr>
<tr>
<td>M1</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>M2</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Set-up times</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Break-down times</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td><strong>Material Wastages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job 1</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Job 2</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Job 3</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
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<tr>
<td>etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factory overhead variable expenses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervision</td>
<td>R</td>
<td>R</td>
<td>± R</td>
</tr>
<tr>
<td>Maintenance</td>
<td>R</td>
<td>R</td>
<td>± R</td>
</tr>
<tr>
<td>Indirect Material</td>
<td>R</td>
<td>R</td>
<td>± R</td>
</tr>
<tr>
<td><strong>Department B</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>ditto . . . . . . . . . . . . . . .</td>
<td>&quot;</td>
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<td>&quot;</td>
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<tr>
<td><strong>Department C</strong></td>
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<tr>
<td>ditto . . . . . . . . . . . . . . .</td>
<td>&quot;</td>
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</tbody>
</table>
The illustrated procedure allows the production manager to find the answers to four basic questions, namely:

(a) Why did the variance take place?
(b) Who was responsible for the variance?
(c) What should be done to prevent its continuance or possible repetition?
(d) Who should take the corrective action?

2. In addition four-weekly management committee meetings are held and are attended by the following executives:
   Managing Director
   Financial Director
   Management Accountant
   Production Manager
   Assistant Production Manager
   Marketing Director
   Sales Manager
   Buying Manager

At these meetings detailed statements covering actual costs, sales and profits, together with the relevant budgeted data, are presented and discussed. The same analytical approach is adopted by the Managing Director, as in the case of the production manager, in determining why any variances from the budget had taken place and who was responsible for the particular variance. Once this is established, the necessary corrective action is decided upon, as is the person required to take such action.

At this meeting the production manager reports on the monthly/production variances, by giving an account of how they arose and who was responsible for them. He also informs the committee of the corrective action taken.
## SALES PLAN FOR 197...

<table>
<thead>
<tr>
<th>MONTH</th>
<th>QUANTITY</th>
<th>WEIGHT IN KILOS</th>
<th>SALES VALUE</th>
<th>FACTORY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANUARY</td>
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<tr>
<td>FEBRUARY</td>
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<td>MARCH</td>
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<td>APRIL</td>
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<td>MAY</td>
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<td>JUNE</td>
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<td>JULY</td>
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<tr>
<td>AUGUST</td>
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<tr>
<td>SEPTEMBER</td>
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<tr>
<td>OCTOBER</td>
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<tr>
<td>NOVEMBER</td>
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<tr>
<td>DECEMBER</td>
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</tr>
<tr>
<td>PERIOD TOTAL</td>
<td></td>
<td></td>
<td>R.</td>
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</tr>
</tbody>
</table>

(To be completed by representative)
In the case of output being below the budget and where this is attributed to a lack of orders, the marketing director is required to give the necessary explanations. He does so primarily from an analysis of the sales representatives' performance, in relation to their budgets.

It was further explained that this company involves their sales representatives in the construction of the sales budget. They do this by requiring them to supply information in respect of each of their customers' requirements for the budget period. (See Illustration 7 below). In this way each representative is held responsible for his sales performance in terms of his own budget.

Two other firms interviewed appear to interpret their understanding of the application of responsibility accounting by limiting it to the members of their budgetary committees.
CHAPTER III: FOOTNOTES


(8) Ibid: p. 15.


(10) Ibid: p. 11.


See also:


(13) Ibid: p. 60.


See Also:


(19) Ibid: p.82.


(23) Ibid: p.163.


QUESTIONNAIRE NO. 2
(Final questionnaire)

KINDLY NOTE:
1. Most of the questions merely require a cross to be placed in the appropriate block.

2. If the question is not applicable to your organisation, please place the designation N/A in the answer space.

3. If you are not able to answer a question or if you would prefer not to answer a particular question, please leave the answer space blank.

4. "Comments" where applicable need only be brief.

5. It would be greatly appreciated if the completed questionnaire could be posted by 3 June, 1977 to:

Mr. R. N. C. Beattie
P.O. Box 6705
ROGGEBAAI, C.P.
8012

THANK YOU FOR YOUR HELP.
QUESTIONNAIRE NO. 2

CONFIDENTIAL

THESIS ON S.A. FLEXIBLE PACKAGING INDUSTRY

1. Does your company make use of a system of Budgetary Control? ☐ Yes ☐ No

2. For what specific time periods are the budgets prepared? ☐ SHORT TERM ☐ LONG TERM
   - Weeks
   - Months
   - Years

3. Prior to the preparation of the budget is use made of any of the following publications:
   3.1. Current "Trade Reviews" of the Commercial Banks
   3.2. Reports of the S.A. Reserve Bank
   3.3. Reports issued by the Bureau of Economic Research (University of Stellenbosch)
   3.4. Population Census Report
   3.5. The monthly journals of the Bureau of Census and Statistics
   3.6. Relevant Trade Journals
   3.7. Other Economic publications

4. Prior to the preparation of the budget is a study made of future trends of the Industries which your company supplies with flexible packaging?
   ☐ Yes ☐ No

5. If yes, is this done on:
   (i) a systematic basis
   (ii) a non-systematic basis
   (Please mark appropriate square with a cross)

6. In initially trying to determine the possible level of operations for the future budget period, which of the following methods does your company make use of:
   A. Sales Staff Method, i.e. members of the sales staff play an active role in compiling a Sales "Estimate" or Forecast for the budget period in question. The Sales Budget used being a refinement of the Sales "Estimate" or Forecast.
   1. Makes the fullest use of Method A
   2. Makes only partial use of Method A
   3. Does not make any use of Method A
6. The Statistical Method i.e. use is made of trends, projections and correlation analysis, particularly between sales and economic indicators and statistical assessment of competition is made.

1. Makes the fullest use of Method B
2. Makes only partial use of Method B
3. Does not make any use of Method B

7. Who is primarily responsible for the preparation of the budget?

8. Does your company make use of a budget committee?

9. If yes, how many members compose the committee?

10. Which persons compose the budget committee?

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>DEPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

11. Are human relations techniques applied in your firm in developing a method for obtaining truly active participation in the budgetary control process?

   Yes   No
12. How would you describe the system of communication in your budgetary process?

Please state briefly

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13. Does your company make use of a budget manual which systematises the procedures of budgetary preparation?

☐ Yes  ☐ No

14. What role does the top management play in the budgetary process?

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15. Which of the following budgets does your company prepare?
(Please mark appropriate square(s) with a cross).

<table>
<thead>
<tr>
<th>Budgets</th>
<th>Marked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td></td>
</tr>
<tr>
<td>Purchasing</td>
<td></td>
</tr>
<tr>
<td>Material Consumption Costs</td>
<td></td>
</tr>
<tr>
<td>Labour Costs</td>
<td></td>
</tr>
<tr>
<td>Manufacturing Overheads</td>
<td></td>
</tr>
<tr>
<td>Total Production Costs</td>
<td></td>
</tr>
<tr>
<td>Plant Utilisation</td>
<td></td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td></td>
</tr>
<tr>
<td>Administration expenses</td>
<td></td>
</tr>
<tr>
<td>Selling expenses</td>
<td></td>
</tr>
<tr>
<td>Distribution Expenses</td>
<td></td>
</tr>
<tr>
<td>Net Profit</td>
<td></td>
</tr>
<tr>
<td>Variation in Stock levels re Work-in-progress and Finished Goods</td>
<td></td>
</tr>
<tr>
<td>Cash, i.e., short-term covering receipts, payments and balances to finance annual operations</td>
<td></td>
</tr>
<tr>
<td>Capital Expenditure</td>
<td></td>
</tr>
<tr>
<td>Balance Sheet - Assets &amp; Liabilities</td>
<td></td>
</tr>
<tr>
<td>Capital Employed</td>
<td></td>
</tr>
<tr>
<td>Research and Development</td>
<td></td>
</tr>
</tbody>
</table>

OTHER BUDGETS PREPARED

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/page 4.....
16. Is a Master Budget prepared?  

17. Are flexible budgets prepared prior to the budget period?  

18. Is a flexible budget prepared once actual output is known?  

19. Are fixed and variable costs clearly distinguished in your budget?  

20. Do you make use of any of the following techniques for determining the fixed and variable portions of total cost in the process of budget construction?  
   (Please mark appropriate square with a cross)  
   (a) The high and low points method  
   (b) The statistical scattergraph method with visual curve fitting  
   (c) The method of least squares  
   (d) The establishment of the variability factor for each expense  
   (e) Other methods used  

21. Does your Company operate on the "fixed" budget principle?  

22. If yes, would you alter or revise the "fixed" budget if at some stage during the budget period, changed circumstances indicated that the actual level of activities would differ greatly from the budgeted level of activities?  

23. For which budgets are quantities first established before their values are determined?  

24. Are attempts made to determine price trends for the purpose of constructing cost budgets?  

25. If yes, how would you describe these attempts -  
   (a) In depth studies  
   (b) General observations of current trends  
   (c) Other (state briefly)
26. At approximately what period before the commencement of the budget period are the budget programmes completed and issued to those responsible for its implementation?

   . . . . . . . . . . . . . Months
   . . . . . . . . . . . . . Weeks

27. In the preparation of the budget is consideration given to any key or limiting factors that may be present?

   [ ] Yes  [ ] No

28. What sort, if any, of limiting factors has your company experienced in the past?

   (1) . . . . . . . . . . . . . . . . . . . . . . .
   (2) . . . . . . . . . . . . . . . . . . . . . . .
   (3) . . . . . . . . . . . . . . . . . . . . . . .

29. Are all line managers involved in the budget process?

   [ ] Yes  [ ] No

30. In the preparation and presentation of your budget(s) is effect given to cost-volume-profit relationships?

   [ ] Yes  [ ] No

31. Is any use made of break-even analysis in respect of your budgets?

   [ ] Yes  [ ] No

32. Do your costing and budgetary systems give effect to the concept of "Contribution Accounting"?

   [ ] Yes  [ ] No

33. Do your costing and budgetary systems give effect to the concept of "Responsibility Accounting"?

   [ ] Yes  [ ] No

34. Would you describe your production as mainly jobbing i.e. the production of orders to meet the specific requirements of customer's orders?

   [ ] Yes  [ ] No

35. Do you also produce "stock lines", that is, flexible packaging which has a wide application (e.g. plain bags) and for which orders are later sought?

   [ ] Yes  [ ] No

36. Would you care to indicate very approximately your percentage production relating to

   (a) Jobbing . . . . . . %
   (b) Stock lines . . . . . . %
37. Would you agree that as a jobbing industry there are a great number of variables attaching to your production which present special difficulties in the control of costs?

(Variables referred to such as, large number of orders, specifications of orders, quantities, etc., types, grades of material, costs of material and use of different machines in manufacturing an order).

Comment briefly (if necessary) ....................................................

38. How would you describe the type of costing system in use in your company:

Please state briefly .................................................................

39. Does your costing system provide for the ascertainment of predetermined product costs?

40. In the ascertainment of your product costs (unit costs) are the variable and fixed costs shown separately on your cost sheets?

41. Do you make use of operating standards to determine your product costs?

42. In determining operating standards is use made of any of the following?

42.1 Statistical Analysis

42.2 Time Studies

42.3 Opinions of technical staff

43. How are your direct labour costs absorbed?

43.1 By use of a direct labour rate

43.2 Included in overhead absorption rates

43.3 Other methods .................................................................

/page 7,
44. Which of the following methods do you use in regard to the absorption of factory overheads?

44.1 Material cost percentage rate

44.2 Wages percentage rate

44.3 Prime cost percentage rate

44.4 Labour hour rate

44.5 Machine hour rate

44.6 Other methods used


45. How many different manufacturing operations, in respect of flexible packaging, do you have in your factory?


46. How many different factory overhead absorption rates do you compute?


47. Do you compile factory overhead absorption rates for fixed and variable overheads?


48. In regard to the classification of factory overheads which of the following forms part of your classification.

Departmental

Direct

Controllable

Fixed

Indirect

Uncontrollable

Variable

Functional


49. In regard to the allocation of factory overheads, would you kindly indicate the bases of allocation in respect of the different overhead expenses.

<table>
<thead>
<tr>
<th>Factory overhead</th>
<th>Bases of Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect material</td>
<td></td>
</tr>
<tr>
<td>Foreman</td>
<td></td>
</tr>
<tr>
<td>Supervisors</td>
<td></td>
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<tr>
<td>Factory Manager</td>
<td></td>
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<tr>
<td>Indirect labour (other than above)</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td></td>
</tr>
</tbody>
</table>
49. (Continued)

<table>
<thead>
<tr>
<th>Factory overhead</th>
<th>Bases of Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td></td>
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<tr>
<td>Rent</td>
<td></td>
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<tr>
<td>Building Costs</td>
<td></td>
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<tr>
<td>Insurance (Type)</td>
<td></td>
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<tr>
<td>Insurance (Type)</td>
<td></td>
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<tr>
<td>Depreciation</td>
<td></td>
</tr>
<tr>
<td>Repairs</td>
<td></td>
</tr>
<tr>
<td>Factory clerical services</td>
<td></td>
</tr>
<tr>
<td>COMMENTS, if necessary</td>
<td></td>
</tr>
</tbody>
</table>

50. Do you include 'interest on capital employed' in your business as a cost factor?  

- Yes  
- No

WHICH OF THE FOLLOWING VARIANCES, if any, are reflected in your cost reports or statements. (Kindly mark appropriate block with a cross).

51. MATERIALS

51.1 Material Buying (or Purchase) Price Variance  

51.2 Material Usage (or Quantity) Variance  

51.3 Material Yield Variance  

(*i.e. variations due to changes in the substance or in the weight per uniform area of material)

51.4 Total Material Variance

52. DIRECT LABOUR

52.1 Wage (or Labour Cost) Rate Variance  

52.2 Efficiency Variance

/page 9.....
53. **FACTORY OVERHEADS**

- **53.1** Variable Factory Overheads Expense (or Spending) Rate Variance
- **53.2** Variable Factory Overheads Efficiency Variance
- **53.3** Total Controllable Variable Factory Overheads Variance  
  (i.e., **53.1** plus **53.2**)
- **53.4** Fixed Factory Overheads Efficiency Variance
- **53.5** Idle Capacity Variance (I.R.O. fixed factory overheads)
- **53.6** Volume Variance (i.r.o. fixed factory overheads)
- **53.7** Total Factory Overhead Variance

54. Does your costing system provide for the analysis of variations in costs in respect of:

- **54.1** Machine outputs
- **54.2** Utilisation of machines

**COMMENTS** (if any) .................................................................

55. Realising that variance analysis covers many different aspects of cost, would you care to express an opinion as to the average time period between when a variance is reported and the time when any corrective action is taken.

56. Do you have some tolerance limit or range for cost variances that you consider acceptable?

57. When viewing variances, with a view to corrective action, is use made of the "management by exception" principle?
58. For what specific time periods are variances ascertained and reflected in your cost statements.

- Daily
- Weekly
- Four-weekly
- Monthly
- Quarterly
- Half-yearly
- Annually
- Other

59. Is a record kept of idle machine times?

60. If yes, are these times analysed as to causes?

61. Is a record kept of idle labour times?

62. If yes, are these times analysed as to causes?

63. In regard to machine set-up (make-ready) times do you make use of standards?

64. Are you able to minimise machine set-up times by arranging jobs of similar specifications (e.g., size) in sequential order?

- Very occasionally
- Occasionally
- Frequently
- Very frequently

65. Do you make use of a system of perpetual inventory?

65A. Would you please indicate the approximate range of items of raw materials held by your company.

- 1 - 100
- 100 - 200
- 200 - 300
- 300 - 400
- 400 - 500
- 500 - 600
- 600 - 700
- 700 - 800
- 800 - 900
- 900 - 1000
- over 1000
66. Which method do you use to "cost out" raw materials to production?

66.1 First in, first out

66.2 Last in, last out

66.3 Weighted average

66.4 Standard Cost

Other Method

67. Do you make use of any indices or ratios in respect of inventories?

68. If yes, which indices or ratios do you use?

Please state briefly

69. Please indicate which of the following data is recorded in your Stock Control system.

Minima level

Maxima level

Re-order level

Quantity on order

70. Do you have a system for testing raw material purchases in respect of:

70.1 Quality

70.2 Tensile strength

70.3 Substance

in terms of your purchasing standards?

71. Is a record kept of the quantities of waste of major materials?
72. If yes, are these records analysed in terms of:

72.1 Type of material

72.2 Cost of Material (High, low etc)

72.3 As the result of process or machine

72.4 Supplier of Material

72.5 Other Causes

73. Is any analysis made for determining which categories of stock require the greatest degree of control, in terms of annual consumption costs?

74. Are the purchases of raw material made through a central buying office?

75. Do the circumstances of your business enable the purchasing officer to determine the "Economic Order Quantity" that is, the amount of inventory which should be ordered at one time in order to minimize the annual costs of the inventory?

COMMENT (if necessary)

76. Do you incur any research and development costs in producing new or improved flexible packaging materials?

77. If yes, how are these costs dealt with in your costing system? (i.e., how are these costs recovered?)

CONSIDERED AS:

77.1 An additional cost to all materials converted

77.2 An additional cost to specific materials converted

77.3 A part of factory overheads

77.4 Other methods

/page 13.....
78. Does your company carry out any cost reduction programmes?

79. If yes, is this done on a regular basis?

or as circumstances demand?

80. If yes, would you care to indicate the areas in which your cost reduction programmes have been applied:

80.1 Materials
80.2 Labour
80.3 Manufacturing overheads
80.4 Product Design
80.5 Other

81. Does your company make use of (or made use of) -

81.1 Work Study
81.2 Value analysis

82. Does your company make any use of a computer to process:

82.1 Cost data
82.2 Budget data
82.3 Determination of variances

COMMENTS (if necessary)

83. Would you care to express a quantitative opinion as to your costing systems' major field of usefulness?

A. In the determination of product costs for pricing purposes

B. In the function of cost control

C. Determining "areas" of profitability

(Areas - products, product groups, departments, divisions etc)

e.g. A = 50%    B = 40%    C = 10%

100%
83. (continued)

COMMENTS (if necessary) .............................................
..............................................................................
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Would you like to receive a copy of this thesis? □ Yes □ No

To whom should the copy be sent?

Name: ........................................ Title: ........................................
Address: ........................................

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CHAPTER IV : ASPECTS OF COST CONTROL IN THE SURVEYED FIRMS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page No</th>
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<tbody>
<tr>
<td>4.1 TYPES OF COSTING SYSTEMS EMPLOYED</td>
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</tr>
<tr>
<td>4.2 CONTROL OF MATERIAL COSTS</td>
<td>107</td>
</tr>
<tr>
<td>4.3 CONTROL OF LABOUR COSTS</td>
<td>128</td>
</tr>
<tr>
<td>4.4 CONTROL OF FACTORY OVERHEADS</td>
<td>130</td>
</tr>
<tr>
<td>4.5 COST VARIANCE ANALYSIS AND MANAGEMENT ACTION</td>
<td>149</td>
</tr>
<tr>
<td>4.6 COST REDUCTION</td>
<td>152</td>
</tr>
</tbody>
</table>

FOOTNOTES 161
CHAPTER IV: ASPECTS OF COST CONTROL IN THE SURVEYED FIRMS

4.1 TYPES OF COSTING SYSTEMS EMPLOYED

Firms in the survey were requested to give a description of the type of costing system used by them. The following descriptions were supplied by eleven surveyed firms.

1. Computer based, integrated absorption (full) costing system, with post-job analysis.

2. Standard, based on average product and assessment of actual from the average (meaning that the pre-determined costs of jobs are based on the average past costs of products and these pre-determined costs are compared with the actual costs).

3. Not specific – mixture of standard prime cost per unit volume of output and budgetary control of overheads.

4. Historical job costing.

5. Standard job costing. Unique standards (based on replacement costs) are set for each job and variances reported thereon.

6. Job costing on a full cost absorption basis.

7. Contribution costing system (i.e. direct costing).

8. A standard costing system.

9. Job related costing system (meaning that they relate costs to jobs and make comparisons between their estimated and actual costs.)
10. Individual job costing based on hourly rates applied to each machine.

11. Direct standard costing i.e. marginal costing techniques with pre-determined standards.

From the analysis of the above answers and subsequently received supplementary information, one can describe the costing systems in use as follows:

(a) Six firms employ job order cost systems and do so primarily for the purpose of ascertaining pre-determined job order costs which are used for the determination of selling prices for quotations. Five of these firms also prepare actual job costs, on completion of the production. However, they do so only for a comparatively few selected jobs.

(b) Two other firms have job cost systems but also use certain selected standards, which in effect are averages based on past performance. These firms also compare pre-determined and actual job costs but do so only for a limited number of jobs.

(c) The remaining three firms have standard cost systems, two of which may be more adequately described as direct standard job costing systems, that is systems which segregate variable and fixed costs and also apply the principles of standard costing.

Reliance on Master Printers Federation Costing System

Information subsequently obtained indicates that most of the firms using job costing systems have adopted either wholly or partly the costing system as advocated by the British Master Printers Federation. Details of this
system originally appeared in a manual published by this body in 1913 but has subsequently been revised over the years. The latest edition giving an explanation of this system appeared in 1971 under the new title of "Cost Accountancy for Printers - An explanation of the Federation system of cost accountancy" Part I (1971). An outline of this system is shown in Illustration 1 p.105. The basic aim of this publication appears to be that of proposing uniform costing methods among jobbing printing firms by adopting the same basic methods and principles when determining cost and calculating cost recovery rates.

A second part to this publication entitled "Cost Accountancy for Printers Part II", appeared in 1973. This appears to be a welcomed addition to the subject as it deals with numerous additional topics such as, marginal costing, pricing and standard costing. Unfortunately the chapter on "Standard Costing" which is linked with work measurement and incentive schemes, makes only scant reference to "Material Usage Variances" and thus does not stress the importance of this aspect of control. Here it may be noted in an extract from this publication (See Illustration 2 p.106) that "Material Usage Variance" does not form part of the analysis of variances.
ILLUSTRATION 1

The Federation System of Cost Accounting
Stage 1 - The Plan

The diagram outlines the stages of the Federation System of Cost Accounting:

1. **Budget in total**, based on targets for the period ahead.
2. **Classification of costs**:
   - A = Occupation costs
   - B = Selling costs
   - C = Distribution costs
3. **Allocation and apportionment of costs to budget centres**
4. **Reapportionment of service budget centres**
5. **Methods of relating costs to jobs**:
   - Cost recovery rates based on level of activity which ought to be achieved

**SOURCE**: Cost Accountancy for Printers - Part I. Published by the British Federation of Master Printers, London 1971, p. 17.
### Illustration 2

<table>
<thead>
<tr>
<th></th>
<th>£</th>
<th>£</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard margin</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual sales at standard</td>
<td>230 700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>prices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard cost of actual sales</td>
<td>196 500</td>
<td>34 200</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Price variance</strong></td>
<td>227 000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual sales</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual sales at standard</td>
<td>230 700</td>
<td>3 700</td>
<td></td>
</tr>
<tr>
<td>prices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Labour Efficiency Variance</strong></td>
<td>55 808</td>
<td>10 725</td>
<td></td>
</tr>
<tr>
<td>Actual wages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard wages for work done</td>
<td>45 083</td>
<td></td>
<td>10 725</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume (overhead) variance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other budgeted expenditure</td>
<td>91 036</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(including sorts)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard recovery of expenses</td>
<td>89 129</td>
<td>1 907</td>
<td></td>
</tr>
<tr>
<td>for volume of work done</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead expenditure variance</td>
<td>91 036</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other budgeted expenditure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual expenditure, plus</td>
<td>93 037</td>
<td>2 001</td>
<td></td>
</tr>
<tr>
<td>notional expenses and standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cost of sorts cast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>34 200</td>
<td>18 333</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18 333</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net favourable variance</strong></td>
<td></td>
<td></td>
<td>15 867</td>
</tr>
<tr>
<td>(as in Figure 4/1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Cost Accountancy for Printers - Part II. Published by the British Federation of Master Printers. Now British Printing Industries Federation. - London 1973 p. 28.
4.2 CONTROL OF MATERIAL COSTS

4.2.1 Direct Materials

The direct materials used in the manufacture of flexible packaging are paper, film, polyethylene, aluminium foil, waxes, adhesives, printing inks and lacquers, but these few terms cover a vast range of types and grades of material, each with its own particular cost as has already been referred to in Chapter I. (See also Appendix I Chapter II)

The survey reveals the following number of different items of direct materials used by firms in the manufacture of their products.

<table>
<thead>
<tr>
<th>Number of firms</th>
<th>Size of Firm</th>
<th>Number of direct materials used</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>small</td>
<td>up to 100</td>
</tr>
<tr>
<td>5</td>
<td>medium</td>
<td>200 to 500</td>
</tr>
<tr>
<td>3</td>
<td>large</td>
<td>600 to 1200</td>
</tr>
</tbody>
</table>

Variations in material specifications

Flexible packages may consist of one to six different types of direct materials. Furthermore the multitude of additional variations in material specifications which result from the great variety of orders poses a problem in the control of material costs which is not experienced by firms producing standardised products.

This problem is obviously a major one, particularly as executives report that direct material costs constitute
up to sixty or seventy per cent of the total manufactured costs of flexible packages.

4.2.2 Material price standards

Most firms indicate that they set price standards for each kind of material purchased and use these in predetermining their product costs. In most cases these price standards are the current market prices of the raw material to be used.

The following procedure is typical of that carried out by firms in establishing buying price standards.

1. The procedure carried out for the great majority of orders is that on receipt of an enquiry for the supply of flexible packaging, the current price of the relevant raw material(s) is obtained from the suppliers. In appropriate cases allowances are made for freight, insurance and other relevant charges. The buyer then communicates this price(s) to the costing department which in turn uses the price(s) to prepare an estimated product cost. Here it was noted that one firm inflated the quoted raw material price by five per cent, the purpose of which, it was explained, was to offset any possible increase in the price of the raw material that might take place between the time the price of the raw material was quoted and when the actual order was placed with the supplier.

2. Some speculative buying of raw materials takes place in most firms. There are two aspects to this:

(a) Some purchases of materials are made on the
assumption that firms will continue to obtain specific orders from some of their customers. These assumptions are sometimes based on technical advantages possessed by the converter in producing the customer's packages. In other cases some converters have established a high level of customer satisfaction in respect of past supplies of packaging and confidently expect that these customers' future orders will continue to be obtained. As a result some converters purchase the relevant raw materials in anticipation of the fact that these orders will be forthcoming.

(b) Buyers in some firms explained that, from time to time, offers of special "job lots" of raw material are received from paper mills. These materials are usually an accumulation of "overmakes" on specific orders produced by the paper mills. The possible application of the material for various types of packages and the reduced prices usually result in these offers being readily accepted.

In (a) and (b) the raw material prices used in predetermining the relevant product costs, are the actual prices ascertained from the firm's stock records.

3. Most firms produce what they refer to as "stock lines". These are flexible packages which have a general use, that is, they are not manufactured to meet the specifications of any one customer but can be used by a wide variety of customers. An example of this type of flexible packaging is plain paper bags which are manufactured in various standard sizes.

Because of their standardised nature, these products
are manufactured in comparatively large batches and on completion are placed in a finished goods store. Sales are then executed from these stocks.

This type of production covers no more than five percent of the total production in any one firm. The raw materials used in this type of production are purchased on a replenishment basis and their costs are recorded in the firm's stock ledgers from where the actual prices of the raw material are obtained and used by the costing department to estimate the cost of any batch of "stock lines" to be produced.

4.2.3 Material Usage Standards

The following procedure is typical of that carried out by firms in establishing the standard or estimated quantities of raw material, such as paper, film etc., required to produce jobs in respect of orders received.

1. When an enquiry for flexible packaging is received, it is passed to the costing department, which in the process of pre-determining the cost, establishes the quantity of material required to produce the job.

2. This is done by determining a conversion factor, namely the weight of material per thousand packages. A thousand packages being the common unit of sale.

Use is made of the following formula to ascertain the conversion factor for each type of material and job:
Net weight per thousand packages

\[
= \text{width} \times \text{length of package} \times \text{material area factor per Kilogram}
\]

= \ldots \ldots \ldots \ldots \ldots . \text{Kilograms}

The "area factor" is specified by the supplier of the material.

3. Standard (estimated) percentage waste allowances are added to the net weight of a thousand packages. The majority of firms apply only one percentage to cover all anticipated production waste (See Illustration 3 below) but three firms apply percentages of waste in respect of each process through which the material is to pass. (See Illustration 4 below).

4. The production waste allowances applied to the predetermined product costs, are in the majority of cases based on past data obtained from material waste records.

5. In many cases it is necessary to slit rolls of paper, film, polyethylene or aluminium foil to required widths before production can commence. This usually results in a few centimetres from the edge of a reel of paper etc., being slit off and as such constitutes wasted material. The widths of rolls of material purchased are governed by the technical requirements of the supplier's production process and it is seldom that packaging orders are obtained such that no slit waste arises.

"Slit waste" is also incurred in trimming operations after certain printing processes have taken place. Estimates of "slit waste" are placed at one to four
per cent.

All material "slit waste" is calculated before production takes place and allowed for in the pre-determined costs (see Illustrations 3 and 4 below).

**ILLUSTRATION 3**

<table>
<thead>
<tr>
<th>Pre-determined cost</th>
<th>Cost per 1 000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R  c</td>
</tr>
</tbody>
</table>

**Quantity ordered:** 100 000 bags

**Direct Material**

M.G. White Kraft/60

at R600 per 1 000 Kilograms

Weight per 1 000 bags = (say) 10,00 Kgs

Allowance for production waste = 10%

Allowance to cover slit waste = 2½%

Standard/Estimated cost of direct material 6,65

Gross weight per 1 000 = 11,25 Kgs

**Standard quantity**

of material = 100 x 11,25

= 1 125 Kilograms
ILLUSTRATION 4

Pre-determined Cost

<table>
<thead>
<tr>
<th>Quantity ordered: 500 000 pouches</th>
</tr>
</thead>
</table>

Direct Material

Polyethylene (300 gauge) at R400 per 1 000 Kgs

Weight per 1 000 pouches = (say) 20.00 Kgs  
Allowances for production waste

<table>
<thead>
<tr>
<th>Processes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Printing</td>
<td>4.0</td>
</tr>
<tr>
<td>2. Coating</td>
<td>3.0</td>
</tr>
<tr>
<td>3. Bag-making</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>12.0</td>
</tr>
</tbody>
</table>

Material slit waste 2%

Standard/Estimated cost of direct material  

Gross weight per 1 000 = 22.80 Kilograms

Standard quantity of Material  

= 500 x 22.80  
= 11 440 Kilograms

6. The standard quantity of material for each job is then ascertained by multiplying the gross weight per thousand packages by the number of packages required, divided by a thousand (See Illustration 5 below).
ILLUSTRATION 5

Direct Material

Order for 500,000 printed vacuum sealing packages

Net weight per 1,000 = 12.60 Kilograms
Estimated production waste 6% = 0.76 "
Material slit waste 3% = 0.38 "
Gross weight per 1,000 = 13.74 "

The standard quantity of material required to manufacture the job = \( \frac{500,000}{1,000} \times 13.74 \)
= 6,870 Kilograms

7. This is the quantity of material that would appear on the material requisition. In view of the fact that paper and film are purchased in reel form, each of which weighs from 200 to 400 Kilograms, some companies record the issue of the above standard quantity as shown in Illustration 6 below.

ILLUSTRATION 6

MATERIAL REQUISITION

<table>
<thead>
<tr>
<th>Job No 7/1162</th>
<th>Location: Dept. A Machine No. 2</th>
<th>Total Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetate Film 400 Gauge</td>
<td></td>
<td>7 200</td>
</tr>
<tr>
<td>18 Rolls at 400 Kilograms each</td>
<td></td>
<td>330</td>
</tr>
<tr>
<td>Less 1 part roll to be returned to store</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard quantity for job</td>
<td></td>
<td>6 870</td>
</tr>
</tbody>
</table>

Where the amount of material issued to a job, that is, the
standard quantity, is in excess of the actual quantity used. This excess material is returned to the store. This returned material, in the absence of yield differences, is considered to be a favourable quantity material usage variance. Likewise, where any additional material is required to be issued to complete a job, the additional quantity represents an adverse material usage variance for the job.

4.2.4 Reporting of Material Variances

The surveyed companies were requested to indicate the type of material cost variances shown in their cost statements or reports. The following is a summary of the answers supplied:

<table>
<thead>
<tr>
<th>Number of Firms</th>
<th>Kinds of Variances Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Material Buying Price Variances</td>
</tr>
<tr>
<td>9</td>
<td>Material Usage Variances</td>
</tr>
<tr>
<td>6</td>
<td>Material Yield Variances</td>
</tr>
<tr>
<td>7</td>
<td>Total Material Variances</td>
</tr>
<tr>
<td>2</td>
<td>No Material Variances reported</td>
</tr>
</tbody>
</table>

Material Buying Price Variances

Of the nine firms who indicate that they reflect material buying variances in their cost statements, only two of these firms may be said to do so in the conventional way. These firms employ standard costing systems and compile monthly cost statements which reflect the total material buying variance for both the past month and cumulative period.

One other company using standard costing, produces a weekly and cumulative cost statement in which is
recorded the actual cost of material consumed and the comparable output at standard cost as shown in Illustration 7 below.

This firm does not reflect any material buying variances in their cost statements on a regular basis but only when circumstances warrant it. Thus as shown below in Illustration 7, only the total material variance can be deduced from this statement. Then, only if the total material variance in any period exceeds tolerable limits, is the total variance analysed in respect of any buying price, usage or yield variances. This information then becomes the subject of a special report to management.

The remaining six firms who indicate that they report material buying price variances, use job costing systems but only ascertain this variance for specific jobs and then only if circumstances warrant it. Two quoted examples of these circumstances are:

(i) The need to "check costs" on a new type of order. New types of orders often involve new types of raw materials and packaging specifications which are very different from packages previously manufactured e.g. Sterilisation packages for packaging medical supplies used in hospitals. Due to the lack of relevant past data, the pre-determined costs of a new type of order are much less reliable than for jobs which have been manufactured before and on completion of the new job, actual costs are compared with those estimated. In the carrying out of this procedure material price variances are reported upon.
(ii) When an order being manufactured has been keenly priced to meet competition. On the completion of such orders similar job costs comparisons are made, the main purpose of which is to note any variations in profitability.

ILLUSTRATION 7

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Actual Cost</th>
<th>Standard cost of output</th>
<th>Actual Cost</th>
<th>Standard cost of output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td></td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Film</td>
<td></td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Polyethylene</td>
<td></td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Aluminium foil</td>
<td></td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Inks</td>
<td></td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Adhesives</td>
<td></td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Waxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total direct materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Material Usage Variances

The same nine firms which indicate that they reflect material buying variances in their cost statements also report that they do so in respect of material usage variances. The procedures carried out by these firms in reporting material usage variances, follows a fairly similar pattern to that of their reporting material buying variances, which is as follows:

1. Two of the firms applying standard costing reflect material usage variances in the conventional way, by recording these in their monthly and cumulative cost statements. In addition, both firms produce supplementary statements giving details of the causes of material usage variances. These statements are reviewed at monthly management meetings where appropriate action in respect of variances is decided upon.

The data for these supplementary statements is obtained mainly from their records of material waste. In this regard one of these companies has a comprehensive system for ascertaining the amount of material waste incurred on every job. This is achieved by making use of the specially designed "Waste Control Job Record" as shown in Illustrations 8 (a) and 8 (b) (pp.119-120).

This form provides for all material and output data relating to each job to be recorded, making possible the comparison of actual and standard amounts of material waste. In the case of excessive waste, the reasons are stated on this job record.
WASTE CONTROL JOB RECORD

<table>
<thead>
<tr>
<th>RAW MATERIAL REQUISITION:</th>
<th>TIME ORDERED</th>
<th>REQUIRED</th>
<th>RECEIVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUSTOMER</td>
<td>ORDER NO.</td>
<td>DATE</td>
<td></td>
</tr>
<tr>
<td>MACHINE</td>
<td>DEPARTMENT</td>
<td>REMARKS &amp; SIGNATURE</td>
<td></td>
</tr>
<tr>
<td>DESCRIPTION OF MATERIAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>CODE</td>
<td>MARK'S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G/M²</td>
<td>WEIGHT Req</td>
<td></td>
</tr>
</tbody>
</table>

TALLY SHEET

<table>
<thead>
<tr>
<th>Roll No.</th>
<th>WT</th>
<th>G/m²</th>
<th>Roll No.</th>
<th>WT</th>
<th>G/m²</th>
<th>Roll No.</th>
<th>WT</th>
<th>G/m²</th>
<th>RETURN TO STOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rolls</td>
</tr>
</tbody>
</table>

N.B. OPERATORS MUST SIGN FOR EACH DELIVERY

TO COSTING. PRELIMINARY ADVICE OF EXCESSIVE WASTE.

ESTIMATED EXCESSIVE WASTE: % KG.

REASON

SIGNED: MANAGER/FOREMAN

MATERIAL TRANSFER

<table>
<thead>
<tr>
<th>FROM O/N</th>
<th>TO O/N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WEIGHT:

SIGNED:
**DAILY WASTE RECORD**

<table>
<thead>
<tr>
<th>Date</th>
<th>Production</th>
<th>M/R</th>
<th>M/C</th>
<th>Production</th>
<th>M/R</th>
<th>M/C</th>
<th>Production</th>
<th>M/R</th>
<th>M/C</th>
<th>Production</th>
<th>M/R</th>
<th>M/C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WASTE RECORD TOTALS**

<table>
<thead>
<tr>
<th>TOTAL Wt. On.</th>
<th>TOTAL Wt. Off</th>
<th>TOTAL Rolls Off</th>
<th>TOTAL Bags</th>
<th>TOTAL Sheets</th>
<th>TOTAL M/R</th>
<th>TOTAL M/C</th>
<th>TOTAL Trim</th>
<th>TOTAL WT</th>
</tr>
</thead>
</table>

**TOTALS**

**EMARKS:**

**AND**

**REASONS:**

**SIGNED (OPERATOR):**

**SIGNED (MANAGER/FOREMAN):**
2. One other company using standard costing as previously mentioned, produces weekly and cumulative cost statements from which it is possible to ascertain only the total material variances. (See Illustration 7 p.117)

In addition this company produces a weekly material waste report for all completed jobs. This report and notably any excessive waste is studied by the managements, in conjunction with the cost comparison statement and appropriate corrective action is taken where necessary.

3. One company employing job costing does not report material usage variances in the conventional way but analyses material waste daily, in respect of each machine. This is done by making use of a special statistical form (See Illustration 9 p.122)

This is a dual purpose form which apart from being used to record material waste, also records machine production and non-production times e.g. running time, make-ready time, breakdown time etc.

This form permits daily comparisons to be made as between the actual and budgeted amounts of waste in respect of each machine. This information is also recorded in the form of monthly summaries and cumulative totals which are firstly reported to production management and then top management.

4. The remaining five firms who indicate that they reflect material cost variances in their cost statements or reports, use job costing systems. As previously pointed out these firms only ascertain
### Bagmaking & Sheeting Production Statistics

<table>
<thead>
<tr>
<th>M-C No.</th>
<th>Hour Utilized</th>
<th>No Bags Made</th>
<th># Str.</th>
<th>Good Kgs. Made</th>
<th>Record Waste</th>
<th>Good Kg/Total Hr.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>Act</td>
<td>Bud</td>
</tr>
</tbody>
</table>

**Formula:**

\[
\text{No Bags} \times \text{Gross Kgs.} = \frac{\text{Good Kgs.} \times \text{Run Hrs.} \times 60}{\text{HR} \%}
\]

**Total Record**

- Total Weighted
- Variance

**Explanations & Notes**

- Weighted Waste %

**Table Data:**

- Data to be filled in by hand.

**Notes:**

- Additional explanations or notes if necessary.

**Date:**

- Day
- Month
- Year
### Interpretation of headings in Illustration 9

<table>
<thead>
<tr>
<th>Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-c No</td>
<td>Machine number</td>
</tr>
<tr>
<td>Hours utilised</td>
<td>Machine running time</td>
</tr>
<tr>
<td></td>
<td>Machine make-ready time</td>
</tr>
<tr>
<td></td>
<td>Machine break-down time</td>
</tr>
<tr>
<td></td>
<td>Idle machine hours</td>
</tr>
<tr>
<td>STR/Min</td>
<td>Output per minute (straight running time)</td>
</tr>
<tr>
<td>Goods Kgs.made Act</td>
<td>Actual weight of good bags made expressed in Kilograms</td>
</tr>
<tr>
<td>Good bags</td>
<td>Bags which are not defective in any way i.e. saleable bags</td>
</tr>
<tr>
<td>Good Kgs. made Bud.</td>
<td>Budgeted weight of good bags made, expressed in Kilograms</td>
</tr>
<tr>
<td>Record waste</td>
<td>Record of waste per machine per day</td>
</tr>
<tr>
<td>Goods Kgs/Total Hours</td>
<td>Good bags in Kilograms divided by the total production hours = Actual and Budgeted good bags per hour</td>
</tr>
<tr>
<td>Total Record</td>
<td>Daily total of all waste as recorded above</td>
</tr>
<tr>
<td>Total weighed</td>
<td>Daily total weight of all waste per the weighing machine.</td>
</tr>
</tbody>
</table>
variances for specific jobs when circumstances warrant it. However all these firms keep waste records to inform their managements of the extent and trends in material waste on the basis of which appropriate action is taken.

Two of the main ways in which these companies present information to their managements on waste are:

(i) The weight of waste material, classified as to the type of material.

(ii) The weight of waste material, classified as to the machine or process responsible for the waste.

Some Causes of Adverse Material Usage Variances

The following are the main reasons for adverse material usage variances quoted by executives in the firms.

1. Poor quality material.
2. New forms of packages entail experimentation, resulting in an excess of the quantity of material used.
3. The training of new operators, that is, during the initial period of training of an operator, more material is used than would normally be the case.
4. Some of the older machines are unable to meet consistently, modern packaging standards and this results in some abnormal material waste. An example of this, is the case of some printing machines which lack the modern electronic controls which ensure automatic alignment of the print. Most
firms report that these older machines are in the process of being replaced by modern machines.

Material Yield Variances

This type of variance arises as a result of certain variations which occur in the manufacture of paper and film used in flexible packaging. These variations relate to changes in the weight of material per uniform area within the same batch of material. This factor has already been referred to as "the material area factor" (see p.111) but is more commonly known in the trade as "the substance of the material".

The technical processes involved in the production of paper and film are such that it is technically impossible to ensure absolute uniformity of the substance in any batch of material produced.

The significance of these variations is that apart from technical considerations, they affect the material costs of packages. For example, if the actual average substance of one batch of material is above the standard specified by the supplier, it brings about a reduction in the expected yield of packages (see Example below) and this increases the material cost of packages produced.

EXAMPLE

Package size = 10 cms x 20 cms - material substance standard as specified = 60 grams per square metre.
Weight per thousand packages based on standard substance

\[
\frac{1000 \times 10 \times 20}{10000} \times 60 = 1.2 \text{ Kilograms}
\]

Weight of batch of material supplied = 2 400 Kilograms

Expected yield of packages based on standard substance =

\[
\frac{2400 \times 1000}{1.2} = 2 000 000 \text{ packages}
\]

Weight per thousand packages based on average actual substance of 64 grams per square metre =

\[
\frac{1000 \times 10 \times 20}{10000} \times 64 = 1.28 \text{ Kilograms}
\]

Yield of packages based on average actual substance of 64 grams per square metre =

\[
\frac{2400 \times 1000}{1.28} = 187 500 \text{ packages}
\]

Reductions in yield due to increased substance = 12 500 packages.

Adverse Material Yield Variance =

12 500 x pre-determined material cost per thousand.

Conversely, a decrease in the actual average substance of the material results in an increase in the yield of packages and a favourable material yield variance. However, it was pointed out that if the substance was very much below the standard, the tensile or breaking strength of the material would be below par. When this is the case, breaks frequently occur in the reels of material being converted on a flexible packaging machine, thus increasing production costs and offsetting any favourable material yield variance. In some cases further problems may arise, in that the reduced breaking strength of the packages may not be acceptable to the customer.

The material yield variance can remain undetected and consequently
could be "merged" with a material usage variance unless appropriate procedures are carried out prior to production. Only six firms state that they reflect these material yield variances in their cost statements or reports. However, nine firms, inclusive of the said six, indicate that they carry out procedures for testing their incoming raw material for substance and tensile strength in terms of their purchasing standards. It is only when these tests reveal substance differences outside the tolerable limits that material yield variances are reported upon by firms.

The substance test is carried out by sampling portions of the rolls of paper and film when purchased. This is done by cutting out pieces of the material with a template measuring 10 cms by 10 cms and weighing them on a special machine which indicates the substance on the appropriate scale. When variations in the substance of a material are consistently outside the standard, this sometimes results in a change of the source of supply.

Pieces of material are also tested on a machine which records the tensile strength of the material in grams per square centimetre. This is compared with the specified tensile strength and if necessary, appropriate action is taken in regard to the supplier.
4.3 THE CONTROL OF LABOUR COST

4.3.1 Determination of Wage Rates

The flexible packaging industry forms part of the South African printing industry and the patterns of employment and minimum wage rates are governed by agreements formulated by the National Industrial Council for the printing industry. These agreements cover periods from two to three years and are statutorily enforceable under the Industrial Conciliation Act No. 28 of 1956 (as amended).

The National Industrial Council consists of both employers' and employees' representatives who are the negotiating parties to the agreements. The employers' representatives are members of the Master Printers Federation of South Africa. The employees are members of the South African Typographical Union of South Africa.

Although agreements cover minimum wage rates, most firms in the industry pay wages in excess of these rates. Wage rates also differ from industrial area to industrial area within the Republic.

4.3.2 Direct Labour Cost Control

Five firms in the survey report that they reflect "Wage Rate Variances" in their cost statements and seven firms indicate that they show "Labour Efficiency Variances". However, discussions reveal that these variances relate mainly to "Hand Operations" or "Hand Work" which form a very small portion of a firm's total output.
The highly mechanised nature of the industry has already been referred to in Chapter II and consequently productivity in any one firm is largely governed by machine performance. Machines are manned by skilled and semi-skilled operators who constitute the major part of the direct labour force. The effectiveness of this category of labour has therefore to be measured in terms of the relevant machine outputs and firms absorb these direct labour costs in their manufacturing overhead rates.

Contrary to the more conventional approach, four firms treat their direct labour costs as fixed in the short term. Their reasons for this are that the number of machine operators is not reduced if any machines become temporarily idle during the course of a year. These firms report that in the event of a machine becoming idle, the operator is usually required to give assistance on an active machine or in some instances, may be involved in doing some shift work. If idle operators cannot be used in this way, they are retained and charged to "Idle Time".

The remaining five firms treat their direct labour costs as variable and do so by including these costs in their variable machine-hourly rates.

In view of the demand for skilled printers and packaging machine minders in the industry, it would be most unlikely that firms would dismiss such members of their production staff when machines become idle for short periods. Furthermore, in view of the fact that various combinations of machines are used to manufacture jobs, only a full order book with the
optimum product mix at all times will ensure all plant being active. Owing to the competitive nature of the industry, the full utilisation of all plant is an ideal rarely achieved by any firm. As one executive pointed out, even a full order book can result in some machinery being idle if the correct product mix is not present.

Therefore taking account of the fact that some idleness of machinery is inevitable in firms and taking a realistic view of the nature of direct labour costs in firms, the better view, it seems, would be to treat them as fixed in the short term.

The three firms using standard costing do not compare actual direct wages with "standard" separately but include these comparisons with that of their factory overheads and any differences between actual and standard direct wages forms part of their factory overhead variance analysis.

4.4 THE CONTROL OF FACTORY OVERHEADS

4.4.1 Types of absorption rates used

Three firms in the survey do not indicate the type of absorption rates used by them but nine firms indicate that they compute machine hourly rates for each of their machines. These rates are used for pre-determining their product processing costs which is a complex activity as shown in the following table:
TABLE 1

The number of different manufacturing processes in firms.

<table>
<thead>
<tr>
<th>Size of Firm</th>
<th>Number of different manufacturing operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (3)</td>
<td>4 to 5</td>
</tr>
<tr>
<td>Medium (5)</td>
<td>8 to 15</td>
</tr>
<tr>
<td>Large (3)</td>
<td>18 to 50</td>
</tr>
</tbody>
</table>

One firm reports that it has fifty different machine hourly rates. Four firms report that they use machine hourly rates which are composed of both the fixed and variable elements of manufacturing overheads. Five firms compute separate machine hourly rates for absorbing their fixed and variable overheads.

Three firms report that in addition to using machine hourly rates to absorb manufacturing overheads, they also compute "Handling rates". These rates relate to the costs of handling and storing materials. Apart from the cost of holding raw material and finished good stocks, there are considerable costs involved in moving bulky raw materials from one process to another. These costs include indirect labour, the utilisation of floor space and the use of special equipment. The handling rate is expressed in Rand cents/per 100 kilograms and is computed annually as follows:

\[
\text{Budgeted costs of storage and handling materials} = \frac{\text{Budgeted tonnage of raw materials to be converted}}{\text{The budgeted handling rate.}}
\]
These companies apply these handling rates to their pre-determined product costs on the basis of the weight of raw material to be converted. They exercise control over these costs by making periodic comparisons of the budgeted data with the actual costs incurred and actual tonnage of raw material converted.

4.4.2 Types of Factory Overhead Variances Reported by Firms

The following is an analysis of the type of factory overhead variances reported by nine firms in the survey. The remaining firms do not indicate the type of factory overhead variances reported by them.

<table>
<thead>
<tr>
<th>Variance Reported</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Variable Factory Overheads</td>
<td></td>
</tr>
<tr>
<td>Expense Rate Variance ... I</td>
<td>3</td>
</tr>
<tr>
<td>2. Variable Factory Overheads</td>
<td></td>
</tr>
<tr>
<td>Efficiency Variance .... II</td>
<td>2</td>
</tr>
<tr>
<td>3. Total Efficiency (Controllable) Variable Factory Overheads Variance (i.e. (1) plus (2))</td>
<td>4</td>
</tr>
<tr>
<td>4. Fixed Factory Overheads</td>
<td></td>
</tr>
<tr>
<td>Efficiency Variance .... III</td>
<td>5</td>
</tr>
<tr>
<td>5. Idle Capacity Variance.. IV</td>
<td>3</td>
</tr>
<tr>
<td>6. Volume Variance (i.e. (4) plus (5))</td>
<td>6</td>
</tr>
<tr>
<td>7. Total Factory Overhead Variance (i.e. (3) plus (6))</td>
<td>8</td>
</tr>
</tbody>
</table>
Reference I above

This variance is the difference between the actual variable factory overheads incurred and the budgeted allowance based on the actual machine hours worked.

Reference II above

This variance recognises the difference between the actual machine hours, that is, hours chargeable to jobs and the standard (or allowed) machine hours allowed in the pre-determined job costs. The difference in hours is multiplied by the appropriate variable machine hourly rate to ascertain the variance. The following is an illustration of how this variance is ascertained by the firms concerned.

**ILLUSTRATION 10**

<table>
<thead>
<tr>
<th>Machine or Machine Group</th>
<th>Actual machine hours for the period</th>
<th>Total of Standard (or allowed) hours per pre-determined job costs</th>
<th>Difference in hours. Favourable (Adverse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACME machines</td>
<td>250</td>
<td>200</td>
<td>(50)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable machine hourly rate</th>
<th>Variable Factory Overhead Efficiency Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 10</td>
<td>R 500 ADVERSE</td>
</tr>
</tbody>
</table>

The sum of these variances and that of the expense rate variances equals the total efficiency factory overheads variance.
Reference III above

This variance is calculated in the same way as the variable efficiency factory overheads variance illustrated in Reference II above, except that the difference in hours is multiplied by the fixed machine hourly rate.

Reference IV above

This variance consists of fixed costs only and is computed by taking account of the budgeted machine hours (or normal capacity hours) for the period and on which the fixed machine hourly rates were based. The variance is calculated by ascertaining the difference between the actual and budgeted machine hours and multiplying this by the fixed machine hourly rate, thus indicating to management either the over or under-absorbed fixed factory costs. In the latter case revealing the cost of budgeted machine hours not used.

A further analysis reveals the following:

<table>
<thead>
<tr>
<th>Number of firms</th>
<th>Number of Factory Overhead Variances reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Do not indicate</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>
The last two mentioned firms use standard costing systems and fully analyse their total factory overhead variance. They do this by using basically a four-variance method, that is, they report (1) the expense rate variance (2) the variable efficiency variance (3) the fixed efficiency variance and (4) the idle capacity variance.

Another firm using standard costing uses a three-variance method by reporting (1) the expense rate variance (2) the total variable efficiency variance and (3) the volume variance.

The remaining firms have job order costing systems and cannot analyse factory overhead variances to the same extent as those using standard costing. They rely mainly on periodic comparisons of their actual and budgeted totals of factory overheads, for their control of these costs, notwithstanding that some of these firms only prepare "fixed" budgets. The assumption in these latter firms is that there is only one fixed output for the forecast period. However in view of the jobbing nature of flexible packaging, many different levels of output can result. Therefore the assumption made is an unrealistic one and consequently any comparisons made in these firms between budgeted and actual costs cannot be very meaningful in terms of cost control.

The Main Factors influencing the Control of Factory Overheads

Discussions with executives in firms indicate that the three main factors which influence the costs of
converting flexible packaging raw materials into packages are:

(i) the efficiency with which machines operate i.e. the hourly outputs attained by machines when effectively employed;

(ii) the utilisation or effective employment of machines i.e. the extent to which the production potential represented by available machine hours is realised and consequently the extent to which fixed factory overheads are absorbed;

(iii) variable factory overheads i.e. those items the costs of which fluctuate with activity and are therefore susceptible to day to day control.

4.4.3 Machine Operating Efficiency

Eight firms report that their costing systems provide for the analysis of machine costs in regard to variations in hourly outputs. Most firms using job costing, endeavour to achieve this by keeping a weekly record of estimated and actual job times for each machine. The following is a typical summary record kept by these firms for reporting machine operating efficiency. (Illustration 11)
The above type of information is also recorded on a cumulative basis.

These firms report that when the "Efficiency Percentages" are below a hundred per cent, thus revealing that actual job times have exceeded those estimated, the causes of the more significant differences are investigated and reported to their management who then take appropriate action.

These firms do not however evaluate this information in terms of cost. If this were done, it would give more meaning to the statement in terms of cost control. This could easily be achieved by producing some additional columns in the above statement and applying the appropriate machine hourly rates, as shown in the following illustration, which is a method adopted by one firm.
ILLUSTRATION 12

MACHINE OPERATING EFFICIENCY STATEMENT

Month of __________

<table>
<thead>
<tr>
<th>Machine or Machine group</th>
<th>% Efficiency</th>
<th>Efficiency variance R</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These statements are presented at monthly management meetings attended by the managing director, production manager and cost accountant who review them and take the necessary action to prevent the continuance or recurrence of any adverse variances.

(See recommendation Chapter VII)

Some Causes of Adverse Machine Operating Efficiency Variances

Some of the reasons quoted by executives in the firms for the variances are:

1. Poor quality material. On occasions poor quality material is received, the defects of which are not always possible to ascertain at the time of purchase but only become apparent in the production
Two of these main defects are:

(a) Variations in widths, within the same reel of material.

(b) Tensile strength of material below that specified and not revealed by the sample test prior to production. These factors result in machine stoppages and thus increase production times.

2. Reduced hourly outputs during the training of new and inexperienced operators.

3. A series of small orders.
Large orders make it possible to improve the hourly outputs as the production proceeds. In the case of small orders, this is not always possible as, in many instances, by the time machine adjustments and refinements have been made to obtain the optimum hourly outputs, the order is completed. Thus a series of small orders with varying specifications, tends to produce some adverse variances.

4.4.4 Plant Utilisation

Ten companies indicate that they produce information which reflects the cost of idle plant, that is, the cost of idle machine hours.

Four firms visited, employing purely job costing systems, all keep records of actual machine hours. Two of
these compare weekly and cumulatively, actual machine hours with the available hours. The available machine hours are based mainly on a normal shift of forty hours per week. However, in some instances where machines work regularly in excess of a normal shift, such as a double shift, this additional time is taken into account in the available hours.

Illustration 13 below, is typical of the way in which these firms present this information to management. Copies of these statements go to their top management, production manager and sales manager each week. The main purpose of this is to emphasise the need for additional work for those machines with idle time.

The other two firms compare weekly and cumulatively, actual machine hours with those budgeted which are the hours used in computing their machine hourly rates. In addition these firms evaluate the cost of the difference between the actual and budgeted machine hours and present this information in the manner shown below in Illustration 14 p. 142.

Monthly summaries of this information are presented at monthly management meetings where they are reviewed and action taken in respect of machines operating below the budgeted activity. The action taken is usually directed at increasing marketing efforts in respect of specific types of orders which will improve the activity of those machines which are operating below the budgeted level.

In view of the fact that actual machine hours are used to measure both machine efficiency and utilisation,
and as both of these factors have a bearing on one another, it would be to the advantage of these firms to incorporate both these factors in one statement.

ILLUSTRATION 13

PLANT UTILISATION

Week ending . . . . . . . .

<table>
<thead>
<tr>
<th>Machine or Machine Group</th>
<th>Actual Machine Hours</th>
<th>Available Machine Hours</th>
<th>% Actual to available machine hours</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
One firm employing standard costing does in fact produce such a combined statement, a copy of which is shown in Illustration 15 p. 144. This monthly statement is prepared firstly by comparing the actual and standard job times for a particular machine or group of machines and ascertaining their operating efficiency in the following way:
EXAMPLE

Mollins Bag Machines
Operating Efficiency

Total actual machine times for jobs manufactured during the past month 240 Hours

Total comparable standard times for jobs 200 Hours

Percentage Operating Efficiency = \( \frac{200}{240} \times 100 = 83.3\% \)

Loss Variance = 40 hours \( \times \) variable machine hourly rate (say R5.00 per hour)
= R200.00

This procedure is carried out in respect of all manufacturing operations and summarised under the heading "Operating Efficiency" as shown in Illustration 15.

There is great merit in this type of statement because it shows management, in summarised form, the effect of manufacturing operating efficiency or inefficiency on production costs. In addition this statement does not burden management with the many job variations in operating efficiency but it does enable information relating to any job variations to be supplied to management when necessary. Furthermore this statement has a particular meaning for production management, in that it indicates which machine or machines are operating inefficiently and thus increasing costs.

The second part of the statement is designed to show management the extent to which plant is being
ILLUSTRATION 15

STATEMENT OF OPERATING EFFICIENCY AND PLANT UTILISATION

Month of

<table>
<thead>
<tr>
<th>Manufacturing Operation</th>
<th>OPERATING EFFICIENCY</th>
<th>PLANT UTILISATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Centre</td>
<td>Actual outputs as % of standard outputs</td>
<td>Variance</td>
</tr>
<tr>
<td></td>
<td>Gain R</td>
<td>Loss R</td>
</tr>
<tr>
<td>M₁</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M₂</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M₃</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M₄</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Operations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
effectively used and presumably the cost of idle plant. However in showing the cost of idle plant, this aspect of the statement falls short of what is required for cost control purposes and further comment on this aspect is made below. The data for the plant utilisation section of the statement shown in Illustration 15 is ascertained in the following way:

**EXAMPLE**

**Mollins Bag Machines**

**Plant Utilisation**

Total actual machine times for jobs manufactured during the past month 200 Hours

Total budgeted machine hours for the past month 300 Hours

Actual volume of activity as a % of budgeted volume  
\[ \frac{200}{300} \times 100 = 66.6\% \]

Adverse Activity Variance = 100 Hours x variable machine hourly rate (say R5,00 per hour)  
= R500,00

Here it must be commented upon that the evaluation of the idle machine hours in terms of variable machine hourly rates nullifies the value of this portion of the statement for control purposes. It follows that if machines do not operate, no variable costs are incurred. Hence volume variances cannot arise in respect of variable costs and therefore the variances shown are meaningless.
It is suggested that the use of the "Plant Utilisation" section of the statement shown in Illustration 15 (p. 144) would be of greater value to management if the cost variances showed the extent to which fixed factory overheads were being under or over absorbed, as shown in Illustration 16 (p. 148). This would enable management to establish priorities in directing their sales efforts towards obtaining the types of orders necessary to minimise the cost of idle plant.

Some Causes of Unused Plant Capacity

All firms report that they keep a record of idle machine times together with the reasons for the idle time. Some executives attribute the prime reason for unused plant capacity to the common one of lack of sufficient orders. However, executives point out that there are two specific aspects to this.

First the highly competitive nature of the industry (See Chapter I) results in a pattern in which orders gained on one occasion are lost on another, thus making it difficult to ensure the continuous use of all plant.

Secondly the jobbing nature of the production is such that the assortment of orders obtained, that is, the product mix, plays an important part in keeping all plant active. The large number of different operations present in most firms and the great variety of orders received, makes it difficult to plan the optimum use of all plant.

Other lesser reasons quoted for idle machine time are:
(i) machine breakdowns

(ii) delays in the delivery of certain raw materials from overseas sources, owing mainly to strikes.

4.4.5 Control of Variable Factory Overheads

Seven firms in the survey indicate that they classify their factory overheads into fixed and variable categories in their cost statements. This shows inconsistency in classification among some firms as only five prepare variable and fixed machine hourly rates (See page 131). Some firms use such terms as "Period Factory Costs", "Manufacturing Burden" to denote their fixed factory costs and "Controllable", "Manufacturing Cash Costs" to denote their variable factory costs. Three firms further classify their variable factory overheads under "Functional" headings such as, "Bag-making", "Gravure Printing" and "Laminating", indicating that the control of these overheads is largely the responsibility of the managers in charge of each of these operations.

Only three firms, namely those using standard costing, may be said to operate systems which enable their variable factory overheads to be controlled effectively, in that they provide for the periodic reporting of variances relating to variable factory overheads.
### ILLUSTRATION 16

<table>
<thead>
<tr>
<th>Machine</th>
<th>Actual Machine Hours</th>
<th>Budgeted Machine Hours</th>
<th>Fixed Factory Overheads Machine Rates</th>
<th>Value of Actual Machine Hours (at fixed Machine rates)</th>
<th>Value of Budgeted Machine Hours (at fixed Machine rates)</th>
<th>% Activity</th>
<th>Fixed Factory overheads under or over absorbed</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 1</td>
<td>100</td>
<td>150</td>
<td>20</td>
<td>2 000</td>
<td>3 000</td>
<td>66.6</td>
<td>- 1 000</td>
</tr>
<tr>
<td>M 2</td>
<td>160</td>
<td>120</td>
<td>10</td>
<td>1 600</td>
<td>1 200</td>
<td>133.3</td>
<td>+ 400</td>
</tr>
<tr>
<td>M 3</td>
<td>80</td>
<td>100</td>
<td>15</td>
<td>1 200</td>
<td>1 500</td>
<td>80.0</td>
<td>- 300</td>
</tr>
</tbody>
</table>

* This is the type of information which it is recommended should be included under "Plant Utilisation" shown in Illustration 15.
4.5 COST VARIANCE ANALYSIS AND MANAGEMENT ACTION

As already indicated (See p. 103) firms using purely job costing systems compare actual and pre-determined job costs for selected jobs only. Most of these firms interpret the actual cost of jobs as being the actual cost of direct material consumed plus the actual production times costed at the relevant machine hourly rates, inclusive of labour. Consequently cost comparisons in these companies are mainly confined to material costs and machine production times in respect of the selected jobs. As a result of these job cost comparisons, corrective action is taken in respect of significant cost variations, to prevent their repetition on similar jobs in the future. Two examples quoted of management actions taken in these companies in respect of cost variations are:

(i) the imposing of stricter quality standards in regard to the purchase of raw materials, and

(ii) the elimination of certain technical problems relating to machine processes to improve machine hourly outputs.

In addition executives in some of these firms state that they rely upon their records of material waste to keep them informed of any overall variations in material wastage. If these records indicate that waste exceeds the estimated allowances further analysis and investigation is undertaken to determine the root-causes of the additional waste. Executives state that when these causes have been ascertained immediate steps are taken to correct the position or to prevent its recurrence.

Two firms using standard costing systems present monthly
cost statements to their top management. The statements show cost variances resulting from operations during the past month and for the cumulative period. They also refer to the reasons for the more significant variances. A top management member of one of these companies states that the management's approach in appraising cost variances and applying corrective action, is to concentrate attention on those variances which are indicative of trends rather than on those variances which arise from "isolated" circumstances. Quoted examples of this approach are:

(i) Ascertaining the reasons for the consistently poor machine hourly outputs from one particular machine, as revealed by the efficiency variance statement, and thereafter applying corrective action. This in some instances may require an improvement in supervision or providing additional training for the operator. In other instances an adjustment to the machine may be required.

(ii) An example quoted of an adverse material cost variance not being a trend, is the case of a new type of raw material being converted. Machine operators sometimes experience "teething troubles" when converting a new type of packaging material. However the knowledge necessary for its successful conversion is soon acquired by the operator and any such initial adverse variance is not generally pursued.

A senior executive in one of these companies stated that their cost accountant supplies supplementary information on cost variances, at their monthly management meetings. This information is usually in the form of brief written reports which refer to the causes of the more significant
variances. This executive expressed the opinion that these reports have the benefit of accelerating corrective action, although in some instances, further investigation may be necessary to determine the true cause of a variance before the appropriate action could be taken.

Furthermore it was pointed out that in view of the large number of jobs involved, amounting to some thirty or forty per week, it was difficult to deal effectively with all the resulting variances within a short space of time. Hence they concentrated their attention on the more significant variances and applied appropriate action to the processes concerned. In the event of jobs being completed before any corrective action could be applied, account was taken of the reasons for the variances and this information was used to prevent a repetition on similar jobs in the future.

Most other companies in the study report that corrective action taken by their managements follows fairly promptly after variances have been reported. However some companies indicate that in a few instances, remedial action by their managements may be delayed by as much as one or two weeks. The reasons given for these somewhat lengthy periods are that investigations into root-causes can be a time consuming process. A quoted example of this, is excessive material waste which may be attributed to any one or more of the following factors:

(i) the quality of the material purchased or a portion of it, may be below standard,

(ii) the wrong grade or substance of material may have been used,

(iii) difficulties experienced in any of the following
processes: printing, bag-making, pouch-making, coating, waxing, laminating, sheeting or slitting,
(iv) the colour matching of a job may be unacceptable to the customer,
(v) adhesives used in bag-making may prove unsatisfactory,
(vi) an inefficient operator or operators in any one or more of the above mentioned processes.

In view of the many factors or combination of factors which can contribute to an adverse material variance, an investigation into the root-cause or causes, could involve the investigator in a great deal of time. In many instances abnormal waste was attributed to a combination of the above factors.

In addition seven firms in the survey report that they have tolerance limits as to whether a cost variance should be investigated or not. Some executives indicated their approach in this respect, by explaining that the relative size of the variance in terms of the total job cost was usually the deciding factor as to whether a variance was to be investigated or not. Another stated that it adopts "a common sense attitude" to variances while yet another expressed the view that each variance is judged on its merits.

4.6 COST REDUCTION

In February 1956 the Institute of Cost and Works Accountants (now the Institute of Cost and Management Accountants) produced a research publication entitled "Cost Reduction". The publication defined the term as follows:
"Cost reduction is to be understood as the achievement of real and permanent reductions in the unit costs of goods manufactured or services rendered without impairing their suitability for the use intended."

In enlarging on this definition the publication states "that the retention of the essential characteristics and quality of the product is assured and the term "cost reduction" must be confined to genuine savings in the costs of manufacture, administration, distribution and selling, brought about by the elimination of wasteful and inessential elements from the design of the product and from the techniques and practices carried out in connection therewith".

The publication draws a definite distinction between cost control methods as applied in standard costing and cost reduction. In cost reduction, it points out, standards must be constantly challenged for improvement and products, processes and procedures are subject to continuous scrutiny to see where and how they can be reduced in cost. It further explains that under cost control methods, variances show the effectiveness of control almost daily whereas in cost reduction the potential savings are buried in the standards and can only be achieved by continuous and planned research which must be followed up.

In conclusion, this publication expresses the hope that sufficient active interest would continue to be shown in this subject to exert a significant influence upon the general level of efficiency throughout industry.
4.6.1 Cost Reduction in the Surveyed Firms

All firms in the survey state that they carry out cost reduction programmes but only five firms indicate that they do so on a continuous basis. The remaining seven firms report that they do so only when circumstances demand it. Quoted examples of these circumstances are:

(i) when total desired or budgeted profits are not being achieved due to the intensification of competition,

(ii) when certain products which form a relatively important part of the turnover, become subject to intense competition, as in the case of "a price war" in certain forms of flexible packaging. (See Chapter I).

The surveyed firms indicate that they have applied cost reduction programmes in the following areas:

<table>
<thead>
<tr>
<th>Area of Application</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing overheads</td>
<td>10</td>
</tr>
<tr>
<td>Materials</td>
<td>9</td>
</tr>
<tr>
<td>Labour</td>
<td>8</td>
</tr>
<tr>
<td>Product design</td>
<td>6</td>
</tr>
<tr>
<td>Administrative systems</td>
<td>1</td>
</tr>
<tr>
<td>Selling expenses</td>
<td>1</td>
</tr>
</tbody>
</table>

One firm reported that they applied cost reduction successfully in respect of their packing materials used in despatching finished goods. This firm treated all their packing materials as indirect materials, the annual cost of which formed a substantial part of
their manufacturing overheads. A variety of packing materials, such as heavy Kraft paper, twines, ropes, cardboard, corrugated cardboard, wood and gummed tapes are used for packing finished goods. Recently, however, as a result of a careful study of their packing costs, this company reports that it was able to reduce its annual packing costs by a substantial amount. This was achieved by eliminating some of the types of packing materials and substituting them with other suitable and cheaper forms of packing materials. In addition suitable waste paper obtained from the production processes, is also now used as packing material.

"Cost reduction" may be given a different interpretation as the following examples indicate. Some companies report that they apply cost reduction in their firms by endeavouring to produce flexible packages as substitutes for other and more expensive forms of rigid packaging such as tins and cartons. A quoted example of this approach is the production of a flexible package for marketing motor oil in units of one litre, in place of the traditional and more expensive tin can. This it is contended can result in enormous cost savings to the consumer.

Executives in two other surveyed firms reported that in their opinion, they had obtained their greatest benefits in cost reduction from the use of some new and more sophisticated machinery. This they stated not only brought about increased productivity and lower costs but also reduced human error.
4.6.2 Work Study in Cost Reduction

During the last few decades work study has been successfully applied by various industries in increasing productivity and thus reducing costs. Work study has been defined in various ways but one most widely used is that of the British Standards Institution (3138: 1959) which defines work study as "A generic term for those techniques particularly method study and work measurement, which are used in the examination of human work in all its contexts and which lead systematically to the investigation of all factors which affect the efficiency and economy of the situation being reviewed in order to effect improvement". Work study as recognised today covers a much wider field. A contemporary writer(1) refers to the subject of work study as a comparatively low cost way of either designing work for high productivity or of improving productivity in existing work by improving current work methods and by reducing ineffective or wasted time.

Work Study in the Surveyed Firms

Only five of the surveyed firms indicated that they had made use of work study to reduce costs. Executives in two of these firms explained that their application of work study had been confined to their packing operations. Another company reported that it had revised the lay-out of some of its machinery to improve the work flow.

An executive in still another company expressed the opinion that work study had only a limited application
in his company because the function of most of its labour force was that of supervising machines rather than doing manual operations.

In regard to work measurement and the application of wage incentives in the industry, it is interesting to note that in 1954 the Board of Trade and Industries made an enquiry into the printing industry in South Africa which included the flexible packaging industry. A report was published by the Board in 1955 (2) which made the following comments in regard to the productivity of labour and incentive schemes:

"There are several other spheres in which labour restrictionism has an important bearing on the productivity of the industry. As has already been pointed out piece-work is prohibited in the Agreement and incentive schemes, which at the time of this investigation had only been introduced by one firm in the industry, are subject to the following clause in the Agreement:-

(2) ......... It shall be permissible for any employer to set up a joint production committee, consisting of representatives of the management and members appointed by the chapel concerned, in order to eliminate wasteful methods of production and reduce costs in his establishment.

Should any such committee desire to introduce any incentive scheme which provides an incentive to improved production, such scheme shall be submitted for approval by the Standing Committee after reference to the Joint Honorary Secretaries of the Council, before being put into operation." (3)
The report (4) concluded that this restriction had the effect of discouraging all but the most enterprising firms from introducing incentive schemes, since few are going to risk the expense usually incurred in the investigation of such schemes without some guarantee that they can be applied.

4.6.4 Value Analysis in Cost Reduction

"Value analysis" was originated by Lawrence D Miles of the American General Electric Company (5) in the mid-1940's at a time when minimum cost and optimum use of material were essential to post-war recovery.

Miles was engaged upon cost reduction exercises on a number of the company's products and he developed a set of techniques which later became known as value analysis. "Their first application is said to have saved the company $500 000 in the first year". (6)

The British Standards Institution 3138, defines value analysis as: "A systematic interdisciplinary examination of factors affecting the cost of a product or service in order to devise means of achieving the specified purpose most economically at the required standard of quality and reliability". Other and later definitions of the term are "The identification and elimination of unnecessary cost without reducing the quality, reliability or aesthetic appeal of the product or service concerned" (7) and "an organised and systematic effort to provide the required function at the lowest cost consistent with specified performance and reliability". (8)
The principal objective of value analysis is the elimination of unnecessary costs. The methods of value analysis are conceptually similar to those of method study. Whereas the latter is concerned solely with the minimisation of labour costs, value analysis is concerned primarily with material costs which usually contribute substantially to the total manufacturing cost of any product. (9) The relevance of method study and value analysis is illustrated in the following diagram:

Methods of reducing product costs.

Source: The Techniques of Production Management: By R. Wild p. 18.

Value Analysis in Surveyed Firms

Only three of the surveyed firms indicate that they have made use of the technique of value analysis as a means of reducing costs.

An executive in one company expressed the view that as value analysis was largely concerned with the design of the product, the technique was difficult for
them to apply. The reason for this, he explained, was that the design of the product was mainly governed by the type of product to be packed, the marketing requirements of the customer and the types of flexible packaging materials available on the market.

An executive in another company stated that it applied the technique only in the sense that the value of any proposed packages was always viewed in relation to the value of the product to be packed. This executive also pointed out that a number of flexible packages were appearing on the shelves of supermarkets in which brand names and elaborate colour printing had been eliminated. This he felt was a sincere attempt on the part of flexible packaging and product manufacturers to apply the concept of value analysis and reduce packaging costs.
CHAPTER IV - FOOTNOTES


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<th>Section</th>
<th>Page No</th>
</tr>
</thead>
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<tr>
<td>5.2 AUTHORISATION AND CONTROL</td>
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<td>5.3 DISPOSITION OF RESEARCH AND DEVELOPMENT COSTS</td>
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<td>5.4 RESEARCH AND DEVELOPMENT IN FLEXIBLE PACKAGING</td>
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<tr>
<td>FOOTNOTES</td>
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</tbody>
</table>
5.1 INTRODUCTION

In recent years research and development activities have assumed increasing importance in industry (1) and as one writer points out "the modern industrial concern cannot maintain its competitive position unless it has an active research programme". (2)

Research and development comprises a variety of activities, including a search for new products and new manufacturing processes; improvement of existing products, processes and equipment; finding new uses for known products; solving technical problems in manufacture and application of products; and expanding general knowledge in basic scientific fields. (3)

One authoritative writer (4) on the subject of research and development costs, stresses the need for separating research and development costs from the costs of other functions, by indicating which costs should be included and which should be excluded as follows:

What should be included:

1. Pure research, i.e. direct research or experimentation on general problems having no particular connection with the various products currently being manufactured by the plant.

2. Projects directing experimental or developmental effort toward the creation of new processes or new products or groups of products to be manufactured by their plant.

3. Projects directing experimental or developmental effort
toward any improvement to a specific product already being manufactured or an improvement in an existing process.

This writer excludes costs of technical advice or service rendered to production departments to carry on their normal operations, correcting production difficulties which have reduced normal standards of products and routine tests necessary for normal production procedure on a regular product.

More specifically, an authoritative body, namely, the International Accounting Standards Committee in their Statement I.A.S.9 of March 1978 on the subject of "Accounting for Research and Development Costs" indicates that the following items should be included:

(a) Salaries, wages and other related costs of personnel.
(b) The costs of materials and services consumed.
(c) The depreciation of equipment and facilities.
(d) A reasonable allocation of overheads.
(e) Other costs, such as the amortisation of patents and licences.

Other authorities on the subject also draw a distinction between research activities and those related to development by stating that research is usually confined to the search for new facts or knowledge or new applications of accepted facts, whereas development usually refers to the commercial application of knowledge gained by research. (5)

The Institute of Cost and Management Accountants defines the costs of these two activities separately and does so as follows:
"Research costs are the costs of seeking new or improved products, applications of materials or methods". (6)

"Development costs are the costs of processes which begin with the implementation of decisions to produce new or improved products or to employ new or improved methods and ends with the commencement of formal production of these products by these methods". (7)

5.2 AUTHORISATION AND CONTROL

The problems involved in pre-determining, authorising and controlling research and development costs bear some similarity to those encountered for capital expenditure. (8) However one difference is that research and development costs form the very first stage of the production process and are thus "pre-production costs" and as Batty (9) points out many research projects may never reach the point at which they can be regarded as being part of any beneficial process because they may produce nothing. On the other hand when capital expenditure is being considered there is generally something tangible to be produced which will increase revenue and profits. Thus a feature of expenditure on research and development is the uncertainty of any benefits resulting from it. (10) Many industrial organisations must however incur this expenditure but it should be kept to reasonable limits and a satisfactory number of projects should produce tangible results. (11)

In regard to the planning and controlling of research and development costs a Research Committee (12) takes the view that the principal financial control tool applied to these costs is the periodic budget. It emphasises that the function of the research and development budget is to
control the total amount spent and to ensure that it is spent the way management wants it spent. It also points out that the application of budgeting cost control emphasises the need for advance planning of these costs.

Other writers suggest that an effective means of budgeting for and controlling research and development costs is to consider what projects are worthwhile and should be undertaken during the coming year or other budget period. (13) Furthermore each project should be subject to the sanction of top management. Once projects are so authorised and carried out, periodic reviews can be made, to compare actual costs with the budgeted amounts and at the same time consideration can be given to the feasibility of their continuance.

The Research Committee referred to above sounds a note of warning in regard to the control of research and development costs by stating, "Control techniques should be avoided which consume the time of technical specialists with avoidable routine paper work. The accounting tools used should not in themselves limit the activity of the research organisation. The function of accounting here is to develop the facts, report these facts to both research and top management and to question areas of research of doubtful profitability". (14)

5.3 DISPOSITION OF RESEARCH AND DEVELOPMENT COSTS

Another important question that arises in regard to research and development costs is their disposition. In this regard some writers (15) refer to the difficulty of matching research and development costs with the revenue of the resulting
successful products, in that the generating of these revenues may only take place, if at all, in some unknown future period.

One writer sums up the American point of view on the disposition of these costs, by stating:

"Early authoritative literature recognised deferral of R and D costs as an acceptable practice. But the usual current practice is to recognise R and D costs as expenses as they are incurred." (16)

The view taken in the United Kingdom which agrees with that of the International Accounting Standards Committee (17) is a similar one as evidenced by the following statement:

"In most cases there is little, if any, direct relationship between the amount of current research and development costs and future benefits because the amount of such benefits, and the periods over which they will be received, are usually too uncertain. Research and development costs are therefore usually charged to expense in the period in which they are incurred."

However, this authoritative statement goes on to point out that development costs may be deferred to future periods if all the following criteria are satisfied:

(a) the product or process is strictly defined and the costs attributable to the product or process can be clearly identified;

(b) the technical feasibility of the product or process has been demonstrated;

(c) the management of the enterprise has indicated its intention to produce and market, or use, the new
product or process;
(d) there is a clear indication of the future market for the product or process or, if it is to be used internationally rather than sold, its usefulness to the enterprise can be demonstrated;
(e) the aggregate of the deferred and expected further development costs of the project, together with the related production, selling and administration costs, are reasonably expected to be more than covered by related future revenues; and
(f) adequate resources exist, or are reasonably expected to be available, to provide any consequential increase in cash and other resources needed to complete the project.

However this is likely to be the exceptional case, as generally most firms would find it extremely difficult to satisfy all these criteria for deferring their development costs.

5.4 RESEARCH AND DEVELOPMENT IN FLEXIBLE PACKAGING

Basically research and development work in flexible packaging takes place in response to the newly emerging needs of the wide range of consumers. This brings about the need for new or improved packages and includes the search for suitable flexible packages as alternatives to other forms of packaging, such as rigid or glass containers, having as one of its main objectives the reduction in cost of the existing packages.

Some of the main factors which have initiated research and development programmes in the surveyed firms are:

(i) The growing number of consumer products in South Africa
(ii) The rapid expansion of supermarkets in South Africa over the last decade.

(iii) Changes in the marketing of foodstuffs including a growing number of pre-cooked foods.

(iv) Changes in the promotional methods of retailing.

(v) Changes in packaging materials.

(vi) Changes in packaging technology.

Some of the main changes that have taken place in flexible packages as a result of research and development, are changes in:

(i) Size

(ii) Material

(iii) Shape

(iv) Surface appearance

(v) Improved protection of the product

(vi) Improved convenience in use.

In addition a number of flexible packages have been substituted for rigid packages such as glass jars, tins and boxes.

5.5 RESEARCH AND DEVELOPMENT COSTS IN SURVEYED FIRMS

Nine of the twelve companies participating in the study indicate that they incur research and development costs and distinguish these costs from their regular operating costs. They use the phrase "research and development" to describe a single broad function, that is, they do not draw a distinction between research and development. No company is involved in pure or fundamental research but
three companies with overseas affiliates and parent companies have the benefits of fundamental research as a result of these associations. One such company is a member of a group which has a research and development centre in the United Kingdom (18) where fundamental and applied research work is carried out. This centre makes its findings available to all companies in the group.

5.5.1 COSTS INCLUDED

Although some applied research work is carried out in the laboratories of the surveyed firms, the major portion of research and development work is carried out in the production departments of the various plants, that is, some machine capacities are devoted to this work.

The following is an analysis of the items which the various firms include in their research and development costs.

<table>
<thead>
<tr>
<th>Number of Firms</th>
<th>Costs Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Direct materials, Direct Labour and factory overheads.</td>
</tr>
<tr>
<td>1</td>
<td>Direct Materials, Direct Labour, Factory Overheads and a contribution made to a central research and development centre.</td>
</tr>
<tr>
<td>3</td>
<td>Direct Materials, Direct Labour, Factory Overheads and a portion of Selling Expenses.</td>
</tr>
<tr>
<td>1</td>
<td>Direct Materials, Direct Labour, Factory Overheads and a portion of Selling and Administration Expenses.</td>
</tr>
</tbody>
</table>
The selling expenses referred to above, relate to the cost of personnel in the sales divisions of the particular firms who are either wholly or partially engaged on product development programmes. This function involves the relevant personnel in a considerable amount of liaison work with some of their firm's existing and potential customers and also with members of their own production, engineering and laboratory staffs.

5.5.2 Authorisation of Research and Development Costs

All nine firms include amounts for research and development expenditure in their annual budgets.

In most of the firms, prior to the compilation of these budgets, the budget compiler who, depending upon the firm, may be the budget officer, development manager or sales manager, holds discussions with the senior research and development personnel. These personnel supply the budget compiler with estimates of the amount of material and machine hours that are considered necessary to carry out the proposed projects in the budget period. Where appropriate, estimates of selling and administration expenses are included. The budget compiler then collates this information and prepares a budget along the lines indicated in Illustration I below. This budget is presented to the managing director for approval, who, after taking account of economic circumstances and competition approves it or may require the proposed budget to be revised before granting approval.

In addition to this procedure one firm makes an
ILLUSTRATION I

RESEARCH AND DEVELOPMENT BUDGET

For the year ended ................

<table>
<thead>
<tr>
<th></th>
<th>Annual Budget R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIRECT MATERIAL

(Estimated quantities x prices)

FACTORY OVERHEADS (Inclusive of direct labour)

(Estimated machine hours x appropriate machine hourly rates)

SELLING EXPENSES (where applicable)

(Annual remuneration of sales employees fully engaged on R. and D. or in the case of sales employees only partially engaged, the proportionate amount of remuneration)

ADMINISTRATION EXPENSES (where applicable)

(Based on estimates of stationery and administrative staff's time to be spent on R. and D.)

TOTAL

Prepared by: Approved by:

(Budget Officer) Managing Director
(Development Manager) (Sales Manager)
allowance for contingent research and development work, in their budget. The reason for this it was explained, is that it allows for a degree of flexibility in the application of their research efforts because important changes often developed as the period progresses. Furthermore experience had shown that unexpected promising results often justified the sanctioning of further costs.

Two of the remaining firms also prepare their research and development budgets on the basis of individual projects. In carrying out this procedure these firms make use of their normal production or works orders on which all details relating to the particular work and the total estimated costs are recorded. (See Illustration 2 below). In addition one company records on each such document, the benefits that could accrue to the company if the project were to prove successful, for example "Additional sales of R6 000 per annum".

In these firms the projects and their budgeted expenditures are authorised by the development manager and marketing manager respectively. The approved budgets are then submitted to the budget compiler who incorporates the total estimated cost of all projects in the master budget. These total budgeted amounts are sanctioned by the top managements in the process of reviewing the master budget.

The production orders referred to are also used to authorise the work during the course of the budget year. No project is allowed to be carried out unless so authorised and already in the budget.
ILLUSTRATION 2

WORKS ORDER

<table>
<thead>
<tr>
<th>ORDER No.</th>
<th>DATE</th>
<th>CUSTOMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2501</td>
<td>28.6.78</td>
<td>A TO ZEE (PTY.) LTD. PACKAGING EXPERIMENTAL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRODUCT CODE</th>
<th>DESCRIPTION</th>
<th>DELIVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Printed laminated material</td>
<td>30.6.78</td>
</tr>
<tr>
<td></td>
<td>for thermoforming packs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>on Multivac machine</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>SIZE</th>
<th>WEIGHT PER 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Reel</td>
<td>420mm wide</td>
<td></td>
</tr>
</tbody>
</table>

SPECIAL INSTRUCTIONS:
1. A - ZEE Packaging internal evaluation only.
2. Form W5 Production Observation Sheet to be completed.
3. Please advise Experimental Co-ordinator when running material.

<table>
<thead>
<tr>
<th>MACHINE OR DEPT.</th>
<th>SPECIFICATION &amp; ALTERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIT 4</td>
<td>Stock slit op.wh. Polyethylene 1 out at 445mm with 10mm trim and 320mm offcut. Please return offcut and balance of roll to store.</td>
</tr>
<tr>
<td>X6</td>
<td>Print Strip design on coated side of Polyester - F.W. 30.5 g/m²</td>
</tr>
<tr>
<td>REW</td>
<td>Rewind</td>
</tr>
<tr>
<td>X3</td>
<td>Laminated printed side of Polyester to treated side of opaque White Polyethylene using 3 g/m² Lacquer. F.W. 92.5 g/m²</td>
</tr>
<tr>
<td>SLIT 6</td>
<td>Finish slit 1 out at 420mm with 25mm trim, removing faulty material</td>
</tr>
</tbody>
</table>


W/O Experiment approved by: Head of Department

<table>
<thead>
<tr>
<th>WORKS ORDER</th>
<th>CUSTOMER</th>
<th>QUANTITY MADE</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2501</td>
<td>A TO ZEE PACKAGING EXPERIMENTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.5.3 CONTROL OF EXPENDITURE

Firms compare their actual and budgeted costs of research and development on a monthly basis, that is, as part of their normal budgetary control procedure. In addition, some firms submit technical progress reports of their development work to management each month. These reports in addition to referring to technical aspects of the projects also indicate the degree of success or otherwise of the projects. As a result of these reports decisions are made to continue or abandon particular projects. In appropriate cases approval for incurring further costs is given.

Other firms carry out the same procedure of comparing costs but only submit reports at significant stages of their projects, such as, when positive results have been obtained or when results indicate that a project should be abandoned.

The majority of firms report that notwithstanding the care given to the preparation of these budgets, there is a tendency for actual costs to exceed the budgeted amounts. One reason given for this by some executives, is that the amount of experimental work involved cannot always be predicted, as one discovery may lead to further experimental work and so on, before the work is brought to fruition. Another reason given is that production machines can usually only be made available for development work for short periods at a time, that is, between the manufacturing of normal jobs. This means that the basic machine "make-ready" operations,
such as sizing, filling of ink ducts etc., may have to be repeated a number of times before any specific experimental work can be fully completed and conclusions drawn. This often results in more machine time and materials being used than was originally budgeted for. It appears therefore that a too rigid project budget is not a practical proposition.

As a result of discussions with executives in firms there emerges two main forms of management action when periodic budget comparisons reveal that actual costs are exceeding the budgeted amounts. These are:

(i) The curtailment of some of the less promising projects and the giving of greater support to the more promising projects and in so doing, some firms endeavour to keep within the total budget allocation for the year.

(ii) Increasing the total budget for the year when management is of the opinion that most of all current projects will produce benefits in the near future.

5.5.4 DISPOSITION OF RESEARCH AND DEVELOPMENT COSTS

In all nine companies research and development is a continuing operation and these costs are accordingly viewed as recurring annual costs which most firms report have a tendency to increase steadily from year to year.

The survey shows that seven firms accumulate their research and development costs in a special account by this name and charge them to factory overheads and as such form part of the cost of goods sold in
their income statements. This practice is contrary to the requirements of the International Accounting Standard 9 which states that the total of research and development costs should be disclosed. These firms make no distinction between the costs of successful or unsuccessful projects and no attempt is made to allocate the costs of successful projects to the specific product or product line because the relevant revenues will only materialise in some unknown future period.

In regard to the problem of matching these costs with their revenues, an executive in one of these companies commented as follows:

"Some research projects may extend over two or three years, the benefits of which may only be partial in the following year or two, with the full benefits accruing only at a much later stage. Therefore in view of the uncertainties of the resulting revenues, we make no attempt to defer these costs but charge them in the period in which they are incurred".

These companies follow a similar approach in budgeting these costs, in that they classify them as factory overheads. This in effect means that these costs are included in their overhead absorption rates and hence quotations for all jobs are burdened with a portion of these costs.

One other firm treats research and development primarily as a sales function, in that it considers this type of work to be solely concerned with the promotion of sales, present and future, and consequently it classifies all
these costs under "Selling Expenses" which are deducted from the gross margin in the usual way. This practice as explained above, is also contrary to the International Accounting Standard 9 which requires disclosure of these costs.

The remaining firm's attitude is that research and development lies completely outside its normal operations and accordingly classifies all these costs as "Development Expenses" which are disclosed as such and deducted from the gross margin in the period in which they are incurred. Furthermore this firm does not specifically include these expenses in their quotations for jobs.

Finally it may be noted that in all companies reviewed, although their research and development costs are classified under one of three different expense headings, they are all charged in the period in which they are incurred. This is a policy which is in accordance with the practice in the United Kingdom, the United States and also conforms to the International Accounting Standards on Research and Development Costs.
CHAPTER V: FOOTNOTES

   See also BUCKLAND, T.: Article "Can you account for R. and D."
   Accountancy, April 1974 p. 68.

(2) Moss, M.J.: Article: "Development Costs Incurred in the Plant".


(4) Moss, M.J.: Article: "Development Costs Incurred in the Plant".


(7) Ibid p. 21 para. 3, 221.5.


(9) Ibid p. 87.

(10) BIERMAN, H.J and DUKES, R.E.: Article: "Accounting for Research and Development Costs".
    The Journal of Accountancy, April 1975 pp. 48-49.


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CHAPTER VI: FIELD STUDY CONCLUSIONS

The purpose of this chapter is to summarise the findings of the field study, realising that it is difficult to quantify all the study data. The summary evaluates the presence or absence in firms of management accounting practices which are considered necessary for the effective control of costs.

Where appropriate, suggestions are made which could be of assistance to the relevant firms in improving their effectiveness in controlling costs.

6.1 BUDGETING AND BUDGETARY CONTROL

6.1.1 Forecasting

All the surveyed firms do some form of business forecasting prior to planning their future activities and thereafter formulate their short-term plans and their one-year operating budgets. In doing so, the majority of firms rely mainly upon a study of trends in customer industries and only make limited use of published economic data.

In some firms, prior to budgeting, sales forecasts are developed from estimates received from their sales representatives based on information obtained from their customers. Other firms rely mainly upon information obtained from some of their largest customers for making their forecasts and constructing their sales budgets. However, these methods in themselves may suffer from some degree of bias but if used in
conjunction with appropriate economic indicators, the resulting forecasts may prove more reliable and enable more realistic budgets to be compiled. This in turn should permit more realistic yardsticks to be created for judging performance and achieving effective control.

In regard to long-term forecasting and long-term budgeting most firms confine this to preparing budgets for capital expenditure only, based on forecasts covering periods of three to five years ahead.

6.1.2 Co-Ordination of Budgets

All firms in the survey prepare a comprehensive range of annual operating budgets which are co-ordinated into a master budget which in most cases indicates the expected return on capital employed.

The majority of firms do not make use of budget committees in preparing their budgets. However, the effective use of such committees in these firms, could facilitate the preparation and co-ordination of their budgets. Furthermore the use of such committees can play a useful role in the process of budgetary control as it provides a vehicle for effective communication.

Most firms issue their budgets timeously to those responsible for its implementation thus enabling the relevant persons to become thoroughly acquainted with their budget requirements before the commencement of the budget period.
6.1.3 Application of Price Trends

All firms are aware of the necessity of taking account of inflationary trends in their budgets but in ascertaining price trends most firms rely upon general observations rather than upon an in-depth study of price trends. However, firms generally experience difficulty in ascertaining trends in raw material prices, mainly because of the great variety, varying quantities and grades of raw material purchased, each having its own price.

6.1.4 The Role of Top Management

The findings of the survey also indicate that some firms consider that their top management should be involved in the preparation of the budgets. This would indicate that the role of top management in regard to budgeting is not fully understood in these firms. Although budget preparation is a co-operative action embracing all levels of management, the role of top management, in budget preparation and organisation is, as indicated by some firms (see Chapter III) mainly one of setting objectives and of giving full support to the use of budgets.

Furthermore top management must participate in the review and approval of budgets and the approval should not be a rubber stamp. Top management must also follow up the budgeted results. If there is no feedback with respect to budget results, the budget system will probably not be effective in motivating those responsible for its performance.
6.1.5 Fixed and Flexible Budgeting

The majority of firms prepare their budgets on the "fixed" principle rather than on the "flexible" principle. The reasons for the preference for fixed budgeting by firms can be attributed to the difficulties posed by the jobbing nature of flexible packaging production. This is unlike some other industries where products are standardised and clearly distinguishable, thus facilitating the application of flexible budgeting. The jobbing nature of flexible packaging with its apparent lack of recognisable standard unit of output deters the majority of firms from attempting to apply flexible budgeting.

One approach to this problem, as evidenced by one firm, is to group products within a limited number of broad product classifications and to use the weight (kgs) of sales as a common factor. (See Chapter III). Furthermore by applying an average sales value per Kilogram, to the weight of each product group, it is possible as a matter of simple routine to construct sales budgets for various levels of sales. As a result of this approach, the other relevant budgets can be constructed, the material budget being based upon the weight of sales. Labour costs and variable factory overheads, in respect of the different budgeted levels of activity are based upon production hours, use being made of correlating data between tonnage outputs and production hours.

However, notwithstanding the merits of this approach, some basic problems in applying flexible budgeting in
the flexible packaging industry remain. Two particular problem areas are:
(1) the many variations in the product or sales mix that occur and coupled with this,
(2) an even greater number of variations in the material mix. All this makes meaningful comparisons between "budget" and "actual" for control purposes, extremely difficult.

Flexible budgeting is a valuable tool for the control of variable overheads but as the majority of firms employ fixed budgets they do not possess the means of controlling their variable overheads effectively.

Some contradictory replies indicate that the common relationship between flexible budgeting, cost-volume-profit analysis, contribution accounting and direct costing, is not well understood in some firms. Here it should be noted that once the pattern of fixed and variable costs in firms is ascertained, then the application of any or all of these techniques is possible. Furthermore it permits the integration of a system of direct costing, contribution accounting and flexible budgeting, thus providing the tools for both profit analysis and effective cost control.

6.1.6 Responsibility Accounting

Only a few of the firms show a proper understanding of responsibility accounting and apply it with success. The majority of firms do not therefore, derive the full benefits which responsibility accounting offers in controlling costs. If these firms were to direct greater attention to applying this technique, by
clearly establishing organisational responsibilities and linking these with cost centres then it is highly probable that these firms would improve their effectiveness in controlling costs.

6.1.7 Participation in the Budgetary Process

The need for the participation of all people concerned with the budget is realised by most firms as an essential ingredient of budgetary control. This is done by applying human relation techniques to achieve actual participation in their budgetary systems.

Two firms, however, interpret the meaning of participation in the budgetary process as applying to the executive level only. Yet if these firms were to extend the process of participation to all relevant persons at various levels, then the benefits of improved cost control should follow.

The remaining firms do not give any special attention to this aspect of budgetary control and are thus denied the benefits offered by this technique.

All firms should take account of the significant relationship between responsibility accounting and participation, they are complementary techniques. The effective application of responsibility accounting implies the successful integration with a system of people involvement, together they constitute an effective means of controlling costs.

6.2 PRODUCTION COST CONTROL

6.2.1 Suitability of Costing Systems
The majority of firms in the survey do not operate costing systems which enable their managements to exercise a continuous and systematic control over their production costs. Even though these firms describe their costing systems mainly as job costing systems, they do not operate them in the conventional way. Conventional job order costing systems provide for estimation of costs before the commencement of every job and for the post-production comparison of costs of all jobs. However the majority of firms only carry out this latter procedure on a limited basis, that is, the comparisons of estimated and actual costs are confined to relatively few jobs, the selection of which is mainly influenced by the pressures of competitive pricing rather than from a desire to control costs. The reason for this is that in view of the large number of jobs involved, the compiling of the actual costs for every job would be very time consuming and consequently a costly process.

This situation is different to some other jobbing industries, such as engineering or furniture making where there are considerably fewer jobs, in the course of a year. Under these circumstances the conventional approach for controlling job costs, that is, of comparing the actual and pre-determined job costs, may be considered a practical proposition. Flexible packaging, on the other hand, involves considerably more jobs per year, with most jobs having comparatively short production cycles. This obviously would make the comparison of all job costs a lengthy and tedious procedure.

Furthermore, even if these firms were to apply all
the conventional procedures of job costing, the system would still not prove adequate for controlling costs. Reasons for this are pointed out by Professor L van Sickle who states "The actual and estimated cost comparison, while seemingly an advantage, does not solve the problem of excessive job costs. The excessive cost is not known until after the job is completed and this is an indictment of this type of an actual, historical cost system ..... Probably the most serious disadvantage is that the effort is concentrated upon the gathering of individual job order costs rather than upon the more important measurement of productive efficiency" (1)

Three firms in the survey operate standard costing systems and as such they have devised costing procedures which enable them to produce weekly and/or monthly cost statements which compare accumulated totals of actual and standard costs of production. As a result of the regular presentation of these statements, the respective managements are made aware of variations from the standards in production costs, (in respect of materials, machine efficiency, plant utilisation and manufacturing overhead expenditure) thus enabling them to take any necessary corrective action.

Furthermore it was noted that these systems, with minor modifications, permit cost comparison (i.e. standard with actual) of individual jobs to be made.

6.2.2 Control of Direct Material Costs

Direct material costs constitute approximately two
thirds of the total of flexible packaging production costs and consequently it is an area to which firms should direct their greatest efforts in controlling costs.

The limitations of costing systems in the majority of firms, as pointed out above, are particularly noticeable in the control of material costs in these firms. Although these firms indicate that they report material variances, it is not variance reporting in the accepted sense, that is, in the context of standard costing, but confined to reporting significant variances of relatively few jobs.

These firms rely primarily upon the analysis of their material waste records for the overall control of their material usage and, although there is some merit in this approach, it suffers from two major defects, namely:

(i) It entails the recording of a great amount of data which has to be analysed and investigated before the causes of any excessive waste can be ascertained.

(ii) The reasons for any abnormal waste are only made known at some considerable time after the event. This in most cases means that corrective action is not possible and the information can then only be used to advantage if, or when, similar jobs are produced in the future.

The remaining three firms, by using standard costing, are able to report material variances in periodic cost statements and thus possess the means
of exercising continuous control over their direct material costs. However, it has to be borne in mind that the material variance reported in these statements is the net variance for the period and as such, covers numerous material variances which relate to many different jobs and causes. This necessitates the supply of a great deal of supplementary information to management, before management can become aware of the actual causes of the deviations from the material standards.

Although the application of the principle of "management by exception" has great relevance in these circumstances, not all the material variances are exceptions that require the attention of management. If management in the firms were to direct their attention to every variance, they would be doing very little else. Obviously some sound criteria should be laid down by management, as to which material variances should be reported to management. If this were done then those responsible for reporting variances would save time and effort in not reporting material variances which management does not consider significant, thus permitting more time for investigating the causes of significant material variances.

Two criteria for reporting material variances to management, which may be considered are:

(a) Variances which differ from the standard by "x" per cent or more e.g. 3% and/or

(b) Variances which differ from the standard "y" Rand or more e.g. R100.
As waste can occur in any of the production processes, the procedure adopted by some firms of identifying the amount of material waste, in a specific production process, is to be commended. Such procedure not only assists in locating the cause of any abnormal waste but also enables responsibility to be attached to those persons responsible for it.

In view of this, it is considered that if emphasis were to be placed on preventive measures rather than on corrective measures, it would prove a more effective means of controlling material usage. In this regard it is suggested that the application of material usage standards in respect of each process would be a means of achieving this, with the proviso that machine operators are consulted in the setting of the standards and are made aware of the standard waste allowance before the commencement of their processing operation (See Chapter VII). This procedure it is felt would have a favourable motivational impact on machine operatives and lead to beneficial results.

6.2.3 Control of Labour Costs

The management in firms have only limited control over the fixing of wage rates, as wages are subject to collective bargaining and in the case of skilled labour, they are also subject to a very competitive labour market.

As the function of direct labour is largely one of machine surveillance, the efficiency and utilisation of direct labour is linked to machine performance and utilisation. The practice of firms including direct
labour costs in their machine hourly rates, is therefore a logical one. However, the fixed nature of direct labour costs dictates that they should be included in the fixed machine hourly rates and not the variable machine hourly rates, as is the practice in some firms.

Direct labour costs form a fairly substantial part of production costs, therefore in the interests of control, it is essential that meaningful periodic comparisons be made between the actual wages paid and the amounts recovered in the machine hourly rates. This is a practice which is notably absent in most firms. (See Chapter VII for specific recommendations).

6.2.4 Control of Factory Overheads

For the control of factory overheads to be effective a basic requirement of reporting variations in cost from those pre-determined is in respect of (1) job times (machine efficiency), (2) the extent to which machines are used (plant utilisation) and (3) factory overhead expenditure. Apart from the shortcomings in the reporting of variations in plant utilisation costs in one firm using standard costing, the firms using standard costing report these variances to management which enables management to take appropriate action when necessary.

The remaining firms which form the majority, rely primarily on comparisons between their actual and budgeted factory overheads, that is, a total variance for their control of these overheads, notwithstanding that some of these firms use fixed budgets. In addition
some of these firms rely on supplementary production data in the form of estimated and actual job times and also actual and budgeted machine hours for checking on machine efficiency and plant utilisation respectively. Here it may be noted that the availability of such data permits the determination of the relevant cost variances, by the application of the appropriate machine hourly rate.

If the cost of idle plant is to be minimised in firms, then it is essential that management is presented regularly with statements reflecting the cost of idle machinery. In this way management will be able to relate their marketing efforts to the requirements of the production and thereby minimise the cost of idle plant.

6.2.5 The Application of Cost Reduction

All firms appreciate the need for the application of cost reduction techniques or programmes, although less than half the firms see this as an on-going process. The remaining firms apply cost reduction only when subject to competitive pressures.

Less than half the firms apply any form of work study as a means of reducing costs. Some firms attribute their lack of effort in applying work study, to the highly mechanised and sophisticated nature of their production. Furthermore, the influence of a strong trade union appears to deter managements from applying work measurement and wage incentive schemes as a means of increasing productivity and reducing costs.
Value Analysis

Most firms do not appear to be familiar with the technique of value analysis and others feel that the dictates of their market leave them little scope for applying the technique. However, a few firms have seen the relevance of the technique to flexible packaging and have, in conjunction with their customers, applied it successfully.

6.3 CONTROL OF RESEARCH AND DEVELOPMENT COSTS

Research and development is a necessary function in firms if they are to meet the growing needs of the consumer market for new and improved flexible packages, reduce the effect of competition and create future profitable opportunities for themselves. However in striving to achieve these objectives, there is a possibility of firms spending large sums of money on unfruitful research projects, that is, projects from which no future benefits may be derived. Although it appears inevitable that firms will always incur costs on some unsuccessful projects because of the difficulty of forecasting their outcomes, the amount of money spent on unsuccessful projects should at least be kept to reasonable limits.

In order to achieve this and also minimise research and development costs generally, the survey indicates that there are three main areas where suggested improvements may prove useful to some firms.

These are:

(i) The authorisation of expenditure.
(ii) The on-going control of projects.
(iii) The control of the overall annual expenditure.
(i) AUTHORISATION OF EXPENDITURE

In most firms, it is the senior members of the research and development or marketing staff who authorise the individual (planned) projects to be undertaken during the budget year. Top management's authorisation is confined to their approval or otherwise of the total budgeted annual expenditure only.

Here it is suggested that most firms may benefit by adopting additional procedures which would enable their top management to consider the feasibility of every proposed project before making their decision to sanction them or not.

In practical terms each proposed project should be subject to a cost/benefit analysis before being presented for approval. The technique of cost/benefit analysis focuses on the benefit of a proposal which can be estimated in quantitative terms. Admittedly the difficult part of the cost/benefit analysis is the estimate of the value of the benefits to be obtained. However those responsible for the proposal of research projects should as part of their motivation for carrying out the project, quantify the estimated benefits in the form of additional sales or cost reductions. In addition it is suggested that those concerned should also give an indication of the "probability of success" of the project when seeking its approval. (See Chapter VII - Specimen R & D Project Sanction Form).

Furthermore it is also suggested that management decisions in regard to authorisation of the annual amounts spent on research and development, as well as the amounts for individual projects, will be facilitated if the estimated costs presented to management are classified according to their fixed and variable amounts. This form of presentation will
allow management to take account of the additional (variable) costs that will be incurred, if the proposed work is undertaken or alternatively the costs that will be avoided if the work is not carried out. Although the amount of fixed costs cannot be ignored, it is the amount of variable cost that is most relevant for control and decision-making in these situations.

Top management can then critically examine each project in the light of the above analysis and after taking account of any other relevant factors, such as, developments by competitors or new marketing methods, grant it's approval or withhold it.

In summary, greater emphasis on the linking of authorisation and feasibility, could make the control of these costs more effective in firms.

(ii) THE ON-GOING CONTROL OF PROJECTS

The early detection in firms of the projects undertaken which are no longer considered feasible, is an important aspect in minimising these costs. Managements in the respective firms rely mainly upon periodic technical reports supplied by the development staff for reviewing the progress of their various projects and then make decisions in regard to their continuance or abandonment. However, for this method to be effective, it is essential that management adopt a questioning attitude when reviewing the progress of each project. For example, by seeking answers to the following type of questions:

Is the actual performance up to expectations?
Is the project objective still valid?
Does the progress achieved justify further expense?
Are the expected benefits still available?

It is suggested that answers obtained to these types of questions will assist management in decision making in respect of the continuation of promising projects or in the eliminating of unsatisfactory projects.

(iii) CONTROL OF OVERALL ANNUAL EXPENDITURE

Although all firms prepare annual budgets for their research and development expenditure and apply budgetary control in the conventional way, the control of these costs, by way of periodic variance and analysis, differs somewhat from the control of the main production costs. For example, a large adverse variance may well be an indication of the fact that the additional costs have been well spent, in that as a result of the additional expenditure, increased sales may be forthcoming. Conversely a large favourable variance, may be indicative of the lack of drive in pursuing research and development programmes thus weakening the company's future competitive position. Therefore this type of variance analysis needs very careful investigation in firms before considering corrective action.

6.3.1 Recovery of Research and Development Costs

Most firms consider these costs to be an additional production overhead and accordingly recover them in their current costs of sales. In effect all current selling prices contain an element of these costs and it is a controversial point as to whether these costs should be borne by current sales. There is, however, some justification for this view-point, in that the
additional cost may be considered "the price" which current customers must pay to ensure continued improvements in their supplies of flexible packaging, a factor which best serves the marketing of their own products.

The policy adopted by one firm of classifying their research and development costs under a separate and special heading, namely "Development Expenses" such that it does not form part of their production overheads or selling expenses, is to be commended. This in effect means that unlike the other firms, this firm's normal production costs are not burdened or distorted by their research and development costs. Furthermore, in view of the fact that this item is shown separately in this firm's financial statements as a deduction from the gross margin, it helps to focus management's attention on its magnitude and effect on profits. This is also a practice which is in accordance with the International Accounting Standard 9.

6.4 FINAL ASSESSMENT

As an overall generalisation it is evident that the majority of firms in the survey make only limited use of the techniques of management accounting for controlling costs. These firms tend to place a greater emphasis on the ascertainment of cost as opposed to the control of cost. Because of the jobbing nature of production, the importance of the "cost finding" function cannot be underrated. However, it should be appreciated that pre-determined job costs will only be true if the appropriate type of costing system is used and efficiently applied in controlling costs. A system of "Standard Costing" provides both the costing needs of firms, namely a means of pre-determining job costs and through
cost variance analysis, a means of controlling costs.

In contrast to the above findings, three firms make good use of management accounting techniques and in doing so are effective in controlling costs. These firms, notwithstanding the problems posed by the non-standardised nature of their production, apply standard costing fairly successfully. Their success in applying standard costing stems from their recognition of the fact that although there is a multitude of jobs, they can be reduced to a manageable proportion of "job standards". Accordingly they do not seek to draw conclusions from variances of the many hundreds of jobs but rather from the trend of variances "by process" and of a few broad categories of raw materials.
CHAPTER VI - FOOTNOTES

CHAPTER VII : SOME SPECIFIC RECOMMENDATIONS

7.1 THE ADOPTION OF A SYSTEM OF STANDARD COSTING WHICH INCORPORATES THE PRINCIPLES OF DIRECT COSTING  

7.2 A SUGGESTED AID TO MATERIAL USAGE CONTROL  

7.3 THE COMPILATION OF A MONTHLY OPERATING STATEMENT WHICH RELATES COST CONTROL TO RESPONSIBILITY  

7.4 THE PREPARATION OF A STATEMENT WHICH COULD ASSIST MANAGEMENT IN CONTROLLING FACTORY OVERHEADS MORE EFFECTIVELY  

7.5 THE USE OF A SPECIALLY DESIGNED SANCTION FORM FOR THE AUTHORIZATION OF RESEARCH AND DEVELOPMENT EXPENDITURE  

FOOTNOTES
CHAPTER VII: SOME SPECIFIC RECOMMENDATIONS

7.1 THE ADOPTION OF STANDARD COSTING AND THE INCORPORATION OF THE PRINCIPLES OF DIRECT COSTING

It is recommended that the firms employing job cost (estimating) systems convert to standard costing. If this were done, these firms would be provided with a more effective means of controlling costs than that which they possess at present.

The conversion to standard costing should not prove too difficult a task for the firms concerned, as much of the basic data required for standard costing already exists in these companies. For example, a great deal of data relating to material usage in the form of waste records is available. Properly analysed this data could assist in establishing material usage standards. In addition, a considerable amount of data relating to machine outputs is on record and suitably tabulated and analysed, it could provide the basis for setting machine performance standards.

In addition there are also established procedures in these firms for pre-determining or estimating the costs of all jobs, a procedure common to standard costing. However, in converting to standard costing, cognisance must be taken of the fundamental difference between "estimated" costs and "standard" costs. As Batty points out, "estimated" costs are simply predictions of the actual costs expected to be incurred and differ from "standard" costs in that they may not represent what costs should be when a positive attempt has been made to attain a high level of efficiency.\(^1\) In other words, firms should set standards which aim at a high level of efficiency but which are at the same time capable of being achieved and the managers and supervisors know that the
standards can be attained and accept them as norms. Furthermore, for control to be effective, there should be a challenging of the standards from time to time with a view to improvement.

7.1.1 Material Usage Standards

Because of the very many and different raw materials used, the setting of material usage standards presents, perhaps, the greatest challenge to firms in applying standard costing. In this regard a specific recommendation is made.

As outlined in Chapter IV, it is common practice for firms to use a formula for ascertaining the quantity of the major raw material (paper, film etc.) required for a job. The formula in effect determines the amount of material required for the finished product. In addition an estimated allowance is added for wastage.

It is recommended that standard waste allowances be established, by taking account of the main factors which have a bearing on wastage, namely:

(i) the nature of the material used;
(ii) the process involved; and
(iii) the particular machine used to process the material.

Accordingly it is suggested that "Standard Waste Allowances" tables be drawn up along the lines shown in the following illustration. The figures used are illustrative only.
ILLUSTRATION 1

Process: BAG-MAKING

Standard Waste Allowances.

<table>
<thead>
<tr>
<th>Material</th>
<th>Machine</th>
<th>ACME No. 1</th>
<th>ACME No. 2</th>
<th>PARDEX No. 1</th>
<th>PARDEX No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.G. White Kraft substance 60</td>
<td></td>
<td>5%</td>
<td>6%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>White Sulphite substance 40</td>
<td></td>
<td>7%</td>
<td>8%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>M.G. Brown Kraft substance 50</td>
<td></td>
<td>3%</td>
<td>4%</td>
<td>4%</td>
<td>5%</td>
</tr>
</tbody>
</table>

In the setting of these standards, it is recommended, that use be made of both past data and the opinions of the appropriate technical personnel.

The compilation of the proposed tables will initially involve firms in the preparation of a lengthy list of standard waste allowances. However, once established, it will only be necessary to "up-date" the tables when circumstances so dictate. Furthermore, it may be possible to group certain types of raw material whose characteristics and conversion on the same machines, are similar.

These tables should then be made available to the personnel responsible for the preparation of the standard job costs.
7.1.2 Ascertainment of Standard Cost of Material

Following on the setting of material usage standards, a recommended procedure for establishing the standard material cost of jobs is outlined in Illustration 2 below.

**ILLUSTRATION 2**

**PROPOSED CALCULATION OF THE MATERIAL STANDARD COST OF A JOB**

Weight per thousand packages (Kgs) (per formula) * x (Number of packages ordered ÷ 1000) = .......... Kgs (1) Total weight of material required for a finished product.

*Plus* Standard waste

- Allowance of .... % = .......... Kgs (2)

Standard quantity required for manufacturing the order = .......... Kgs (3) (1) plus (2)

At Standard Price per Kg = R ...... /Kg (4)

Standard Cost of Material = R ...... (5) (3) times (4)

Standard unit cost of material (i.e. per thousand packages) = R ...... (6) (5) ÷ quantity ordered (in thousands)

A similar approach can be made to establish the standard material cost of products sold "by weight" (Kgs). In this case it would be necessary to apply the appropriate formula.

(* See Chapter IV)

7.1.3 The Incorporation of Direct Costing Principles

The term "Direct Costing" as used here, is considered
to be synonymous with "variable costing" or "marginal costing" and not with direct costs in the sense of traceable costs (See Chapter III).

It is recommended that firms apply the principles of "Direct Costing" in conjunction with "Standard Costing". This simply means that in addition to applying "Standard Costing", all direct and fixed costs should be segregated in the various cost statements drawn by firms, for control and quotation purposes.

COST CONTROL

With regard to cost control, it is recommended that weekly comparative cost summaries be drawn up in the manner shown in the following illustration. (See Illustration 3)
ILLUSTRATION 3

WEEKLY PRODUCTION COST CONTROL STATEMENT

............. Week Ending         Week No. ........

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Actual Cost of Output</th>
<th>Standard Cost of Output</th>
<th>Variance</th>
<th>Supplementary Statement/Report Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Materials</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>(Main categories)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Factory Overheads</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL DIRECT COSTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect Labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Factory Overheads</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL FIXED COSTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL PRODUCTION COST</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Should also be prepared on a cumulative basis).
This statement together with the cumulative statement, should be presented to management each week. Thus management will be provided with information which will enable them to exercise continuous control over production costs and particularly over direct costs.

In addition, any necessary reports and supplementary data relating to the variances should accompany these statements. The reports should refer only to significant variances, that is, significant in terms of criteria determined by management. (See Chapter VI). Furthermore, the reports should emphasise the significance of any disclosed variance, in terms of its source, cause and responsibility, thus enabling management to take effective corrective action.

A Guide to Pricing Decisions

An additional benefit that could be obtained from the application of direct costing, is in respect of pricing decisions. The survey revealed that intense price competition exists in the industry. Consequently the problem often facing those responsible for pricing orders, is to know how far to go in meeting competitive prices or in quoting prices for orders which will ensure increased activity of relatively inactive machines. "Full Cost" pricing which is practised by most firms, does not in itself, assist in solving this problem.

However, by using Job Standard Cost Sheets especially designed to show both the total standard unit cost and the total direct standard unit cost of jobs, the pricing problem referred to above is simplified. (See Illustration 4 below). In this way the executive
ILLUSTRATION 4

JOB STANDARD COST

<table>
<thead>
<tr>
<th>CUSTOMER</th>
<th>ORDER NO</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JOB DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUANTITY ORDERED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COST ITEM</th>
<th>TOTAL COST</th>
<th>UNIT COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIRECT MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TYPES OF MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Standard quantities x Standard prices)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIRECT LABOUR AND FACTORY OVERHEADS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MACHINE OPERATIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Standard machine hours x Direct Standard machine hour rates)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER STANDARD DIRECT CHARGES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SELLING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMINISTRATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DELIVERY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL DIRECT STANDARD COST (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIXED COSTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factory Overheads and Labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Standard machine hours x Fixed Standard Machine rates)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SELLING (Allocation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMINISTRATION (Allocation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DELIVERY (Allocation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL STANDARD COST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SALES VALUE / SELLING PRICE (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTRIBUTION (2) - (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NET PROFIT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
responsible for pricing orders would be in a position
to note "the critical point", in the form of the
direct standard unit cost, below which he should not
consider pricing the order.

Furthermore, where circumstances dictate that it is
necessary to price an order below the total standard
cost (but presumably above the direct cost), the
pricing executive would then be able to take account
of the extent to which "the contribution" would cover
the fixed costs. He would in addition be able to
evaluate the extent to which the overall profit would
be increased if the order was obtained at a particular
price. In other words the use of "Direct Standard
Costing" will assist those responsible for making
quotations, to minimise the effect of fixed costs
and thus maximise profits in difficult trading con-
ditions.

Product Analysis

Furthermore, the application of "Direct Standard
Costing" could lead to the preparation of a meaningful
"Product Analysis Statement" for management purposes.
A proposed type of statement is shown in Illustration 5.
p. 212.
ILLUSTRATION 5

PRODUCT ANALYSIS STATEMENT

Month of . . . . . . . .

<table>
<thead>
<tr>
<th>PRODUCT GROUP</th>
<th>SALES</th>
<th>CONTRIBUTION</th>
<th>STANDARD FIXED COSTS</th>
<th>STANDARD NET PROFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RAND</td>
<td>RAND %</td>
<td>RAND</td>
<td>RAND %</td>
</tr>
<tr>
<td>P_1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P_2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P_3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(This statement should also be prepared on a cumulative basis).

The preparation of the above statement could be facilitated by inserting the relevant cost data on copies of sales invoices (as shown in Illustration 6 p.213) and thereafter making the necessary calculations and summaries.
ILLUSTRATION 6

COPY OF SALES INVOICE

Product Code P3

Quantity x Selling Price (As recorded) = Sales Value (1)
Quantity x Direct Unit Cost (per Standard Cost Sheet) = Total Direct Cost (2)
Contribution = (1) minus (2) = (3)
Quantity x Standard unit fixed cost (per Standard Cost Sheet) = Total Standard fixed cost (4)
Standard Net Profit = (3) minus (4)

In addition to the above procedure it is suggested that a product analysis statement, comparing the actual results with those budgeted be drawn up each month. (See Illustration 7 p. 215)

The monthly presentation of such statements (Illustrations 5 and 7) would enable top management to:

(i) review and appraise the efficiency of their company's current pricing practices.

(ii) review the true relative profitability of products or product groups, that is, by noting the relative contribution (%) of each group. The significance of this margin being that it is "unclouded" by any possible arbitrariness in regard to the allocation or apportionment of fixed costs to products.

(iii) take account of the total "Contribution" (Sales
less Direct Costs) yielded by each product group in relation to its fixed costs.

(iv) plan future profits more realistically, that is, by taking account of the cost-volume-sales-profit relationship in respect of the various product groups.

(v) give consideration, in terms of profitability, to the sales of products which should be increased, discontinued or possibly phased out.
ILLUSTRATION 7

PRODUCT ANALYSIS - COMPARISON OF ACTUAL SALES AND CONTRIBUTIONS WITH BUDGET

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>WEEKS ENDING</th>
<th>(Also weeks to date)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>PRODUCT ANALYSIS</th>
<th>SALES</th>
<th>CONTRIBUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual R</td>
<td>Budget R</td>
</tr>
<tr>
<td>P_1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P_2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P_3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTALS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.2 A SUGGESTED AID TO MATERIAL USAGE CONTROL

The survey revealed certain shortcomings in some firms, as regards material usage control. (See Chapter IV). Consequently it is recommended that the firms concerned, consider adopting a procedure which involves the use of a "Material Waste Control Card" as shown in Illustrations 8 (a) and 8 (b). (See pp. 217 - 218).

The card is designed to enable a reconciliation to be effected between the amount of major material (paper, film etc.) issued to a job and its output. An important aspect of the control card is that it should progress with the job through the relevant processes. In each process the applicable input and output data should be recorded in the manner shown in the illustration.

It is appreciated that there may be some difficulties in ascertaining the true output and waste of certain processes. For example, where a portion of material is defectively printed, it may remain in the roll of material in the printing process and only be eliminated in a later process. However, if such problems can be overcome then the use of the illustrated "Material Waste Control Card", could provide firms with a valuable tool for controlling material wastage. Some of the benefits that firms could derive from this procedure are:

(i) Each operator is made aware of the waste standard prior to the processing of the material on his machine. Hence knowledge of this fact could act as a preventive measure in controlling waste.

(ii) Excessive waste is readily located, that is, in a particular process or processes. Furthermore if the facts so indicate, responsibility can be attached to the appropriate operator.
### ILLUSTRATION 8(a)

**MATериал WASTE CONTROL CARD**

(To progress with JOB)

<table>
<thead>
<tr>
<th>CUSTOMER</th>
<th>JOB DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORDER NO</td>
<td>DATE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ISSUES OF MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requisition Numbers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOTAL ISSUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETURNS TO STORE</td>
</tr>
</tbody>
</table>

| NET ISSUES |

<table>
<thead>
<tr>
<th>TYPES OF MATERIAL / SUBSTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEQUENCE OF PROCESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATERIAL QUALITY REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance</td>
</tr>
<tr>
<td>Tensile Strength</td>
</tr>
<tr>
<td>Surface</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

RECORDED BY:
<table>
<thead>
<tr>
<th>TYPE OF DATA</th>
<th>PROCESS 1</th>
<th>PROCESS 2</th>
<th>PROCESS 3</th>
<th>PROCESS 4</th>
<th>PROCESS 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT</td>
<td>Kgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STANDARD WASTE</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALLOWANCE ON INPUT</td>
<td>Kgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STANDARD OUTPUT</td>
<td>Kgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACTUAL OUTPUT</td>
<td>Kgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACTUAL WASTE</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIFFERENCE</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STANDARD / ACTUAL WASTE</td>
<td>Kgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REASONS FOR DIFFERENCES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPERATOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(iii) The procedure permits comparisons to be made between the standard and actual waste of each job or process.

(iv) Completed cards could provide a flexible means of studying trends in material usage. This information could indicate the need for the revision of the existing usage standards.

7.3 THE COMPILATION OF A MONTHLY OPERATING STATEMENT WHICH RELATES COST CONTROL TO RESPONSIBILITY

This recommendation is made on the assumption that firms are using a system of standard costing.

It is recommended that firms prepare and present to their respective managements, the type of monthly operating statement shown in Illustration 9.p.220. In proposing the use of this type of statement, reliance has to some extent been placed upon an article which appeared in "The Cost Accountant" of June 1954. The figures used in the proposed statement are illustrative only. A similar type statement should also be prepared on a cumulative basis.

The main benefits to be derived by firms in presenting this type of statement to their managements, apart from regular profit reporting, are:

(i) Top management is presented with an analysis of the total cost variance, for the past month and also in respect of the cumulative position. In addition, the individual variances are classified under their appropriate sphere of management responsibility.

(ii) The reporting to management of the effect of changes in volume on fixed overhead costs, that is, the extent of their recovery.
# COMPANY'S MONTHLY OPERATING STATEMENT

Month ended ..............................................

<table>
<thead>
<tr>
<th>BUDGET</th>
<th>ACTUAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SALES RESPONSIBILITY</strong></td>
<td>RAND</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>100 000</td>
<td>100,00</td>
</tr>
<tr>
<td>Standard Cost of Sales</td>
<td>80 000</td>
<td>80,00</td>
</tr>
<tr>
<td>Standard Factory Profit (Per Product Analysis)</td>
<td>20 000</td>
<td>20,00</td>
</tr>
<tr>
<td>Selling Costs</td>
<td>3 000</td>
<td>3,00</td>
</tr>
<tr>
<td>Delivery Costs</td>
<td>4 000</td>
<td>4,00</td>
</tr>
<tr>
<td></td>
<td>13 000</td>
<td>13,00</td>
</tr>
<tr>
<td><strong>GENERAL MANAGEMENT RESPONSIBILITY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative Costs</td>
<td>3 000</td>
<td>3,00</td>
</tr>
<tr>
<td>Profit subject to manufacturing efficiency</td>
<td>10 000</td>
<td>10,00</td>
</tr>
<tr>
<td>(This profit was increased/reduced for the following reasons)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EFFECT OF VOLUME</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insufficient hours were worked to absorb fully the fixed overheads</td>
<td>(1 350)</td>
<td></td>
</tr>
<tr>
<td>for the reasons (i) and (ii)</td>
<td>8 650</td>
<td>8,65</td>
</tr>
<tr>
<td>(i) Sales Responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of sufficient orders</td>
<td>(1 200)</td>
<td></td>
</tr>
<tr>
<td>(ii) Production Responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine idle time due to machine breakdown, waiting material or planning</td>
<td>(150)</td>
<td></td>
</tr>
<tr>
<td><strong>BUYERS RESPONSIBILITY</strong></td>
<td>(300)</td>
<td>0,30</td>
</tr>
<tr>
<td>Buying price variance - i.e., raw materials were bought at prices</td>
<td>8 350</td>
<td>8,35</td>
</tr>
<tr>
<td>lower/(higher) than the standard prices</td>
<td>(200)</td>
<td></td>
</tr>
<tr>
<td>Yield variance - i.e., actual substance of raw material purchased</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(above)/below standard substance(100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PRODUCTION RESPONSIBILITY</strong></td>
<td>(800)</td>
<td>0,60</td>
</tr>
<tr>
<td>Material usage - i.e., waste (exceeded)/less than standard allowances</td>
<td>(1 600)</td>
<td>7 750</td>
</tr>
<tr>
<td>Machine efficiency i.e., outputs during effective working hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exceeded/(less than) standard hourly outputs</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Wage rate variance - i.e., actual wages were less/(more) than</td>
<td>1 500</td>
<td></td>
</tr>
<tr>
<td>those allowed in standard rates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controllable factory overheads (exceeded)/ were less than those</td>
<td>(1 000)</td>
<td></td>
</tr>
<tr>
<td>budgeted</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRADING PROFIT</strong></td>
<td>7 750</td>
<td>7,75</td>
</tr>
</tbody>
</table>

(This statement should also be prepared on a cumulative basis)
(iii) The inclusion of appropriate budgeted figures permits management to make comparisons between the actual and budgeted profits for the period.

With regard to (i) above, in order to give greater practical effect to the concept of responsibility accounting, subsidiary statements should be presented to top management and to the appropriate functional managers and their subordinates. The purpose of this latter procedure being to inform and motivate the manager concerned to generate the corrective action necessary to improve performance.

In respect of (ii) above, a recommended supplementary statement is illustrated in the following section (7.4), wherein this variance is analysed, in respect of the various manufacturing operations.

7.4 THE USE OF A PROPOSED STATEMENT WHICH COULD ASSIST MANAGEMENT IN CONTROLLING FACTORY OVERHEADS MORE EFFECTIVELY

The survey indicates that particular factory overheads may be effectively controlled in firms re:

(a) Machine operating efficiency

(b) Plant utilisation

(c) Controllable factory overheads.

In this regard it is recommended that management be presented with the type of monthly statement shown in Illustration 10 p.22:

A similar type of statement showing the cumulative data should accompany the monthly statement when being presented to management. The figures shown in this statement are illustrative only and form part of the analysis of the overhead variances shown in the "Monthly Operating Statement" in
<table>
<thead>
<tr>
<th>COST CENTRE</th>
<th>Operating Efficiency</th>
<th>Plant Utilisation</th>
<th>Wages</th>
<th>Controllable Overheads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual hourly</td>
<td>Favourable</td>
<td>Fixed overheads</td>
<td>Wages recovered</td>
</tr>
<tr>
<td></td>
<td>outputs as a % of</td>
<td>(Adverse)</td>
<td>over / (under)</td>
<td>in standard cost</td>
</tr>
<tr>
<td></td>
<td>standard outputs</td>
<td>Variance</td>
<td>absorbed</td>
<td>rates as a % of</td>
</tr>
<tr>
<td></td>
<td>Rand</td>
<td>hours as a % of</td>
<td>Rand</td>
<td>actual wages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>budgeted hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bag-making Department</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Acme machines</td>
<td>103</td>
<td>150</td>
<td>90</td>
<td>(400)</td>
</tr>
<tr>
<td>Mollins machines</td>
<td>110</td>
<td>500</td>
<td>102</td>
<td>100</td>
</tr>
<tr>
<td>Ajax machines</td>
<td>96</td>
<td>(200)</td>
<td>96</td>
<td>(150)</td>
</tr>
<tr>
<td>Printing Department</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexographic</td>
<td>98</td>
<td>(300)</td>
<td>80</td>
<td>(500)</td>
</tr>
<tr>
<td>Gravure</td>
<td>105</td>
<td>430</td>
<td>95</td>
<td>(400)</td>
</tr>
<tr>
<td>Waxing and Coating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winters</td>
<td>108</td>
<td>350</td>
<td>102</td>
<td>100</td>
</tr>
<tr>
<td>Goaters</td>
<td>92</td>
<td>(280)</td>
<td>104</td>
<td>150</td>
</tr>
<tr>
<td>Sheeting Department</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large sheeters</td>
<td>106</td>
<td>120</td>
<td>85</td>
<td>(300)</td>
</tr>
<tr>
<td>Small sheeters</td>
<td>109</td>
<td>80</td>
<td>90</td>
<td>(100)</td>
</tr>
<tr>
<td>Hand Work Section</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packing</td>
<td>90</td>
<td>(200)</td>
<td>106</td>
<td>100</td>
</tr>
<tr>
<td>Sorting</td>
<td>94</td>
<td>(150)</td>
<td>102</td>
<td>50</td>
</tr>
<tr>
<td>TOTAL</td>
<td>104</td>
<td>500</td>
<td>97</td>
<td>(1350)</td>
</tr>
</tbody>
</table>

|                       |                       |                   |               |                         | Over / (Under)       |
|                       |                       |                   |               |                         | Spent                |
|                       |                       |                   |               |                         | Rand                 |
|                       |                       |                   |               |                         | 94                   |
|                       |                       |                   |               |                         | (1000)               |
Illustration 9 p. 220).

(a) **Operating Efficiency**

The variances shown under "Operating Efficiency" in Illustration 10 relate to the differences between the actual and standard job times for the month. Here it may be noted that the many "job standards" relating to the month's production have been reduced to a manageable proportion of manufacturing operations.

In this way much more effective assistance can be given to management by disclosing the trend of variances "by operation" rather than by attempting to draw conclusions from the variances of a large number of job costs, relating to the month's production. This principle of controlling "by operation" rather than "by job" is applied throughout this statement.

(b) **Plant Utilisation**

The information shown under this heading will provide management with an analysis of the "Volume Variance" shown in the "Operating Statement". (Illustration 10 p. 222)

In effect the data shown under "Plant Utilisation" reflects the firm's ability or inability, to co-ordinate its marketing efforts with that of its productive capacity. The information so reported, could assist management, if need be, in improving the above relationship and thus reduce the incidence of fixed overheads on production costs.

(c) **Controllable Factory Overheads**

The information shown under this heading is an analysis
of the total controllable (variable) overhead variance reported in the illustrated monthly operating statement. In order to report these variances, it will be necessary to classify the accounts, budgets and hourly rate computations, in terms of controllable overheads. This is an item which varies with activity and if variances relating to controllable overhead costs are also classified according to responsibility they could be spotlighted very quickly and as a result, corrective action could be applied.

LABOUR COSTS

The survey revealed that firms charge out their labour costs to jobs by including them in their machine hourly rates. (See Chapter IV). In view of this it would appear advisable for firms to compare periodically, the amount of wages recovered in their machine hourly rates and the actual amount of wages paid. This could be achieved by applying the labour cost portion of the machine hourly rates to the relevant machine hours. The values so obtained could then be compared with the appropriate amounts of wages paid and the differences presented in the manner shown in Illustration 10. p.222.

It should be noted that the data shown in this "Wage" column is an analysis of the total wage rate variance shown in the monthly operating statement.
7.5 The Use of a Specially Designed Sanction Form for the Authorisation of Research and Development Expenditure

A suggested procedure in regard to the authorisation of expenditure for research projects has been referred to in Chapter VI. 6.3(i). In order to give effect to this procedure, it is recommended that use be made of sanction forms, of the type shown in Illustration 11 p. 227.

By using the proposed sanction form and carrying out the implied procedure, management could be greatly assisted in their efforts to control these costs. The reasons being that in the first instance, each research project must be authorised by top management before it can be undertaken.

Secondly top management would be assisted in their decision-making by being supplied with all the relevant information as regards each project, namely:

(i) The objective of each project is clearly set out

(ii) The relevance of any development by competitors is brought to management's attention

(iii) The budgeted costs of each project, both fixed and variable, are indicated. (These latter costs will be based mainly on materials to be used and the machine hours needed for experimental work)

(iv) The possible future benefits are quantified

(v) The probabilities of success of the project are expressed by various members of the technical staff, that is, they provide independent evaluations of the project.

In addition a completed sanction form will enable top
management to exercise priorities in respect of the work to be carried out by the research and development team.
RESEARCH AND DEVELOPMENT PROJECT SANCTION

PROJECT DETAILS

Proposal No. 
Date 

OBJECTIVE OF PROJECT

COMPARABLE COMPETITORS PRODUCTS AND DEVELOPMENTS (if any)

BUDGETED COSTS INVOLVED:

<table>
<thead>
<tr>
<th>Material</th>
<th>Variable R c</th>
<th>Fixed R c</th>
<th>Total R c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factory Overheads</td>
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<td></td>
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<tr>
<td>Administration</td>
<td></td>
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Total budgeted costs

Time period for costs to be incurred:
From .. to .. 19...

ESTIMATED BENEFITS EXPECTED

<table>
<thead>
<tr>
<th>Additional Sales / Cost Reductions</th>
<th>Rand</th>
</tr>
</thead>
<tbody>
<tr>
<td>in first year</td>
<td>197</td>
</tr>
<tr>
<td>in second year</td>
<td>197</td>
</tr>
<tr>
<td>in third year</td>
<td>197</td>
</tr>
<tr>
<td>other years</td>
<td></td>
</tr>
</tbody>
</table>

FEASIBILITY OF PROJECT (opinions expressed as a probability of success)

MEMBERS OF R & D STAFF %

1. ........................................
2. ........................................
3. ........................................

Prepared by (1) (2) (3) (Signatures)

Designation:

APPROVED / NOT APPROVED

Date ................................. MANAGING DIRECTOR

Reasons for non-approval (if necessary)

........................................

........................................
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<th>Title and Edition</th>
<th>Publisher and Location</th>
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<td>Willson, J.D</td>
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