

MANAGEMENT CONTROL THROUGH COSTFINDING WITH SPECIAL

REFERENCE TO A STEEL INDUSTRY

(DUNSWART IRON AND STEEL WORKS, LIMITED)

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By

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PROMOTOR PROF A J E SORGDRAGER D ECON.

ASSISTANT-PROMOTOR D J J CROUS M COM CA (SA).

-Therefore much of the data and facts contained and advocated in this thesis, though not new and novel, is pioneering, exploring and probing AN OLD UNIVERSE IN A NEW WAY.-

Chapter 8 page 232

-. . . . Thou shalt teach them ordinances and laws and shalt shew them the way wherein they must walk, and the work they must do.

Moreover thou shalt provide out of the people able men, such as fear God, men of truth, hating covetousness, and place over them, to be rulers of thousands, and rulers of hundreds, rulers of fifties and rulers of ten. And let them judge the people at all seasons: and it shall be, that every great matter they shall bring unto thee, but every small matter they shall judge; so shall it be easier for thyself, and they shall bear the burden with thee-

Chapter 18

Book of Exodus Verses 20, 21 and 22

-We all know that Moses was successful in leading the Children of Israel out of Egypt. That this was one of the first recognised instances of effective organization is less well known.-

cf Lamperti F A and Thurston J B - Page 13 - Internal auditing for management - Prentice - Hall inc., New York 1953.

-Somewhere in there Jethro covers the job of the chief executive in setting policy and procedures, the need for job definition and for delegation, the use of the hierarchy, and the principle of management by exception. And on top of that, it's probably the shortest consultant's advice on record.-

cf CARL DEURR - Page 214 - Management kinetics: Carl Duerr on communication - McGraw - Hill London 1971.

P R E F A C E

During the years that were taken up in the research for this thesis, it was inevitable that people as they were would come to the fore. Some were friendly and helpful. Others were less so.

Already long before the completion of this thesis it became abundantly clear to whom so much was owed. Firstly to God Almighty, our Maker, for the privileges of the wellbeing and health that made the years between possible. Secondly to the people without whose helpfulness and kind assistance nothing could have been accomplished. With this my most sincere thanks and appreciation to:

- 1 Prof dr A J E Sorgdrager, my promotor, tutor and mentor, for his invaluable advice, wealth of knowledge, indomitable spirit and unselfish sacrificing of his time - be it at night or over weekends. He was always friendly and helpful.
- 2 My wife and to my late parents whose greatest wish it is, and was, to see the years of study, work and research necessitated by this thesis culminate in success.
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- 9 The Potchefstroom University for Christian Higher Education a special thank you for allowing this thesis to be presented in English.
- 10 Finally, the numerous other people who in so many ways assisted in making this project possible.

Now in concluding this preface, I take the opportunity of explaining why the usual practice of limiting quotations and excerpts from cited authorities to a maximum of three lines only has not been adhered to. This was done specifically to facilitate further study, investigation and research with this project as the basis.

SOLI DEO GLORIA

C F O RADEMAN

BENONI

February, 1975.

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GENERAL INTRODUCTION AND PROBLEM DEFINITION

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GENERAL INTRODUCTION AND PROBLEM DEFINITION

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1 INTRODUCTION

With the advent of the sententious seventies, startling new phenomena of almost Orwellian proportions have manifested themselves to further challenge the ability of management to manage, and the effectiveness of its control.

Sententious is interpreted as pregnant i.e. expectant in terms of Webster's new dictionary of synonyms; G and C Merriam Massachusetts U.S.A. 1968; in the sense of the new world of control that must now be born.

These new phenomena, coupled with the old in everchanging guises and forms, are indeed formidable and relentless opponents of the already sorely tried contemporary management controls.

It is to the techniques and tools available to managements of basic industries such as steel making, that this thesis is dedicated. These techniques must provide not only the means of scientific management of the spectrum in a cost intensive and highly automated industrial world, but also the mechanics to safeguard and protect assets and income automatically despite an acute shortage of costly skilled clerical labour.

2 DEFINING THE PROBLEMS

2.1 The vital need for express reporting

With the change in the contemporary management approach has come a change in the emphasis of management control. Speed of presentation of control data is now of the essence with the emphasis changing from historical accuracy-intensive information to appropriate action-intensive data. MANAGEMENT INFORMATION NEED ONLY BE ACCURATE ENOUGH FOR THE APPROPRIATE REMEDIAL ACTION with the majority

...../of

of the data required for policy decision formation obtained from outside the sphere of pure accounting information.

Efficient contemporary management requires that control reports must be issued speedily and frequently to enable corrective action to be taken before it is too late. The complexity and the dynamic nature of the economic climate wherein contemporary business entities must not only survive, but also grow, emphasise this need for the rapid reporting of adverse factors. The speed of presentation is far more important than precise accuracy of detail as vital policy decisions cannot be delayed awaiting the accumulation, preparation and presentation of accuracy-intensive historical data. It is vital today that early warning signs must alert management to untoward factors BEFORE IT IS TOO LATE. Starreveld R W concurs with this concept, and he states categorically that it is only essential to know timeously of adverse factors in their entirety. Starreveld considers that

Aan die begripsbepaling te stellen eisen

Een doelmatige begripsbepaling m.b.t. de totaliteit van de onderhavige materie zal m.i. aan de volgende eisen moeten voldoen:

- (A) zij dient datgene te bundelen wat een zodanige samenhang vertoont, dat bestudering en/of regeling daarvan in onderling verband uit een oogpunt van efficiency geboden is;
- (B) zij dient af te splitsen dat wat uit een oogpunt van doelmatigheid zonder bezwaar afzonderlijk kan worden bestudeerd en geregeld.

Reeds terstond kan worden opgemerkt, dat een op een dergelijke basis tot stand gekomen begripsbepaling een vloeiend karakter zal dragen, doordat er samenhangen van verschillende importantie zullen kunnen worden onderscheiden, zodat er naar gelang van die importantie verschillende grenzen kunnen worden getrokken. Bij verandering van de economische omstandigheden of van de technische mogelijkheden zullen die grenzen zich bovendien verplaatsen. Het laatste hebben wij bijvoorbeeld zien optreden bij de intrede van het ponskaartensysteem en wij zien het nu weer gebeuren bij de komst van de elektronische administratie-machines. Ook gewijzigde inzichten m.b.t. vraagstukken op het gebied van de interne bedrijfsorganisatie kunnen die grenzen doen verschuiven.

cf Leer van die administratieve organisatie (deel 1) page 3 Samson, Alphen aan den Rijn, 4th Edition 1972.

- 2.2 The exigency for the management information system to be founded on, and comply with, the objectives of internal control

The term management information system is of Anglo-Saxon origin and has various definitions. Starreveld R W (1972) of cit, page 3 for instance, differentiates between:-

- (a) Routine informatie
- (b) Systematische informatieverwerking
- (c) Die samehang van a en b.

One of the foremost problems of today, the problem-intensive seventies, is the exigency for an integrated accounting installation. At the outset it must be emphasised that close attention must be paid to the significance of the term -integrated-. Van der Schroeff H J page 490 clearly illustrates this point in his approach that integration - integratie - is to be interpreted to mean a particularisation of costs by means of -algemene-and-gespecialiseerde-kostenstellen and not a cocktail approach as in the Anglo-Saxon philosophy.

(cf Van der Schroeff H J Kosten en kostprijzen - 8ste druk - Kosmos - Amsterdam 1974)

There is therefore an urgent need for an integrated accounting installation that has as -by-products- the reporting aspect of a scientific and fast management information system, and an integrated accounting system based on an internal control that is both static - automatic and omnipresent - and dynamic as propounded by Rademan C F O.

cf Internal control: a study of its historic developments, contemporary concepts and imminent needs to suffice modern demands. An unpublished Master's dissertation (Unisa) 1972.

The requirement is therefore for an internal control that is NOT in the -dress- of yesteryear, but one that is re-orientated in its thinking and flow, revitalised with a

...../shot

-shot in the arm- of the -live- supervision at the source requirements of the space age of today;
 an emergent management control, updated, - dressed- in the -fashion- of TODAY and armed with the
 weapons of the -atomic- contemporary business world.

- 1) Gustafson P acknowledges the complexities of the problems of management when he states that as business becomes increasing decentralised and complex, more and more does today's executive need a sensitive instrument panel to keep from flying blind, to see what's going on and whether people are doing what they're supposed to be doing. TODAY'S INSTRUMENT PANEL IS MANAGEMENT CONTROL.

cf Gustafson P -Business reports: how to get facts you need. Nation's Business volume 44 no. 8 (August 1956) pp 78 - 82 New York

The internal control envisaged is one where, interwoven in every phase of the transacting, recording and custodianship functions are basic, built in automatic divisions and sub-divisions of the twin or dual streams of static and dynamic control; those controls which, negative or positive, tangible or intangible, real or psychological, permeate the spectrum to form the umbrella that safeguards, guides and protects the undertaking.

This thesis in no way belittles the concept of control of De Paula, Lancaster and the other pioneers (known as internal check) as it finds that it is still the same - only now re-orientated, revitalised and applied in a format and manner to befit its new designation MANAGEMENT CONTROL!

Koontz H and O'Donnell (1955) op cit, page 546 in their work published some twenty years ago already emphasised that control (management) is a major managerial function at every level.

2 3 The theory of management control

2 3 1 Evolution of the theory of management control

A variety of authorities and their definitions of control and controls have been reviewed. The outcome of this is that there are many sectional views, aspects and definitions of control and controls. The most significant facts that have emerged from this investigation are the following:

- (a) There is little, if any, agreement between the authorities on the definition

...../of

of control and controls. Few of the authorities consulted even refer to the term management control. In most instances where reference is made to management control it is in the sense of production or budgetary control.

- (b) Internal control is the nearest term in meaning to management control, and this is as seen by the American, South African and Australian authorities on auditing. Yet these authorities are lacking in their penetration into the depth, scope and coverage of their definitions. They do not see their internal control as the management control that permeates and covers the spectrum of the business entity in its entirety. They seem to have either missed or avoided the indisputable fact that AS ALL CONTROLS ARE THE RESPONSIBILITY OF MANAGEMENT, THESE CONTROLS ARE IPSO FACTO MANAGEMENT CONTROLS. THEREFORE, AS SUCH, THESE CONTROLS ENCOMPASS THE SAME AREA THAT MANAGEMENT AUTHORITY AND RESPONSIBILITY COVER - THE ENTIRE UNDERTAKING!

Before proceeding further let us now briefly summarise some of our findings in our review of the authorities:

(1) Wilson F E

This author discusses control statements and management control statements. This, in actual fact, is a new name for the cost statements of the past and in no way can be construed to define management control.

cf Wilson R E - Industrial cost controls - Prentice Hall inc. - Englewood Cliffs N J 1971, Chapter 10 Management information for control, decision and actions.

(2) Rodgers D C D

No mention is made by this authority in his entire book of management control. This is obviously a severe criticism on this contemporary authority as this work was published in 1971.

cf Rodgers D C D - Accounting for managers - Associated business programmes limited - London SW1 - 1971.

(3) Reeser C

This authority exemplifies the statement made previously that many authors see management control only in the text of inventory or budgetary control and little else.

cf Reeser C - Management: functions and modern concepts - Scott, Foresman and company - Illinois 1973.

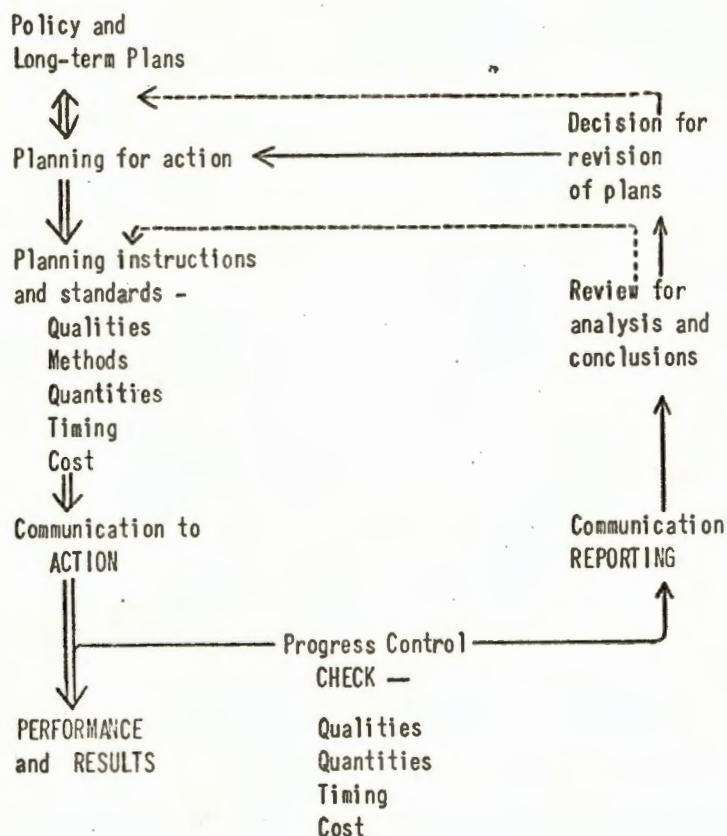
(4) Brech E F L

Of the contemporary authorities, Brech has devoted more attention to management control

...../in

in its true sense than most. He defines control as the verification of current performance with predetermined standards. He advocates the use of the field of financial activities to provide the means of control and identifies this field of financial activities as management information. On page 22 of his works Brech depicts his planning-control feedback cycle as follows:-

THE PLANNING - CONTROL FEEDBACK CYCLE



(Solid lines represent normally expected flow; broken lines represent periodic/possible alternative).

The flow lines between the stages embody the human relations and actions (consultation, communication, motivation). Management judgement is exercised appropriately at all stages. The co-ordinated flow of the whole process in the cycle reinforces the unity of management action.

Comparing and contrasting this flow diagram with that set out on page 112 for swift policy decisions based on express reporting as the inlet to the highway of scientific management control, it becomes apparent that Brech also envisages management control as being the comparison of actual results with budgeted results. There is no mention of internal control.

cf Brech E F L - The principles and practices of management - Longmans Green and Co. Limited, London 1966.

(5) Denyer J C

This technical writer makes no mention even of internal check in his specialised reference to office management. This can be construed as a severe criticism on a work of reference published as late as 1967.

cf Denyer J C - Office management - MacDonald and Evans Limited, - London 1967.

(6) Dew R B and Gee K P

Management control is mentioned only in passing by these two eminent authorities in their work of reference published in 1973. They state on page 36 that the management accountant's system is as yet only in the very early stages of its development as a management control and information system. From this fact they then come to the conclusion that management must in practice still depend largely on information outside this conventional system. These authorities then infer that management information should enable management to monitor performance comprehensively and to obtain an indication of those activities which seem to deserve special attention at any given time, thus providing CONFIRMATION THAT PROGRESS IN ALL FIELDS IS IN ACCORDANCE WITH WHAT IS REQUIRED, AND THAT THE EXTENT AND SIGNIFICANCE OF ANY DEVIATIONS ARE READILY APPARENT. This is the epitomy of what is propounded in this thesis, as a competent management information system must ONLY REVEAL VARIANCES FROM THE NORM AND, BY SO DOING, AVOID MASSES OF USELESS AND TIME-CONSUMING DATA PROVING THAT ALL IS WELL.

cf Dew R Beresford and Gee K P - Management control and information - the MacMillan Press Ltd., - London 1973.

(7) Starreveld R W op cit.

This authority treats all aspects of control in detail but never directly relates his works to the all important aspect of management control.

cf Starreveld R W - Leer van de administratieve organisatie - deel 1 en deel 11 - N Samson - Alphen aan den Rijn 4th Edition 1972.

(8) Drucker P F

This authority in his latest work published in 1974 is the most advanced in the science of management control. He states that controls consists of measurement and information. He differentiates between controls as pertaining to the means and control as the end. Controls deals with events of the past whereas control deals with expectations, i.e.,

...../the

the future.

Therefore controls are analytical and concerned with what was and is, and control is normative and concerned with what ought to be. On page 495 he states that the task of the management controls is purely to supply the means to the end; the END IS CONTROL. Drucker then proceeds to pass judgement on his own works as regards management control when he goes on to acknowledge that herein lies the problem. The man who is charged with producing the controls is the controller. But all executives, including the controller, would consider it gross misuse and abuse of controllership were the controller to use his controls to exercise control in the business. Drucker comes to the conclusion that should this be the case the undertaking would go out of control altogether. Finally Drucker scientifically specifies that to afford management control, controls must satisfy the following seven specifications:

- (a) They must be - economical
- (b) - meaningful
- (c) - appropriate
- (d) - congruent
- (e) - timely
- (f) - simple
- (g) - operational

In the case of this authority there can in all fairness be only two criticisms, viz:

- (i) By assumption decisions must flow consequentially from one to the other. Firstly, he does not differentiate between routine and abnormal decisions. Secondly, he is silent as to the means of activating and maintaining this flow of decisions.
- (ii) His definitions of management control are not sufficiently all-embracing as he is technically academic and therefore inclined to take the accounting and socio-legal aspects for granted.

The above two criticisms can be material when it is considered that this is one of the latest works of reference and published only in this year.

cf Drucker P F - Management, tasks, responsibilities, practices - Heineman London 1974.

(9) Uris A

This author like most of the other contemporary writers does not touch upon management control as such. He concentrates on the arts of management such as management by objectives.

cf Uris A - Mastery of management - Dow Jones - Irwin inc., - Illinois 1969.

(10) Newman B

This is one of the great American authorities on auditing and, like most of his contemporaries, he concentrates, by name and by function, on administrative and accounting controls. He does not correlate nor equate these controls to management control, but treats them separately. He regards administrative controls as concerned mainly with operational efficiency and the ensuring of the adherence at all times to prescribed policies. Accounting controls are the controls which must safeguard assets and income and ensure the continued reliability of the financial records.

cf Newman B - Auditing, a C P A review text - John Wiley and sons inc. - New York 1964.

(11) Richards M D and Nielander W A

These two authorities submit that the essence of control is the action which regulates operations to predetermined standards, all based on the appropriate action in the hands of management. Again, management control as such is not specified and the means of ensuring that only decision-intensive and not routine information reaches management are not touched upon.

cf Richards M D and Nielander W A - Readings in management - South Western Publishing Co. - Cincinnati 1958.

(12) Johnson J T and Brasseaux J H

These two American authorities on auditing differentiate between

- (i) Internal administrative control
- (ii) Internal accounting control
- (iii) Internal check

They define internal control as comprising the plan of organisation and all the co-ordinate methods and measures adopted within the undertaking to promote operational efficiency and to encourage adherence to prescribed managerial policies; the checking of the accuracy and reliability of its accounting data; and the safeguarding of assets.

cf Johnson J T and Brasseaux J H - Readings in auditing - South Western Publishing Co, Cincinnati 1965, and adapted by du Toit L M. Unpublished auditing papers and lecturers (Unisa) 1968 - 1974.

(13) Anthony R N

This is another of the great American authorities on auditing and management accounting. As is the case with practically all the other writers on this subject he sees internal control from the socio-legal side and not as management control from the point of scientific management. Anthony exemplifies the stereotyped outlook of the profession when he states that the governing objective of financial accounting is to furnish statutory information to outsiders, and that the objectives of management accounting is to be helpful to insiders. He however makes an important concession by concluding that management, for its own needs, can make whatever rules and regulations it finds most useful without worrying whether these rules and regulations conform to some outside standard. Anthony has therefore, if only tacitly, acknowledged the existence of management control as a combination of statutory, i e., socio-legal, and internal self-regulatory factors of control.

cf Anthony R N - Management accounting - Richard D Irwin inc. - Illinois 3rd Edition 1968.

(14) Baxter W T and Davidson S -

These authorities discuss under management control only monthly analytical reports. This substantiates the fact that management control is misconstrued to consist of the reporting function only.

cf Studies in accounting theory - Sweet and Maxwell Ltd, London 1965 on page 549.

2 3 2 The theory of management control

The income of an undertaking is derived from its assets and as the management is solely responsible for the performance, growth and continued prosperity of the undertaking the objectives of management is, of necessity, to safeguard the assets and income and to ensure the optimum utilisation of the production facilities at all times. AS CONTROL CONSISTS OF ALL THE MEASURES ADAPTED BY MANAGEMENT TO ACHIEVE THIS OBJECTIVE, SUCH MEASURES AUTOMATICALLY ENCOMPASS THE SAME SPHERE COVERED BY MANAGEMENT'S AUTHORITY AND GENERAL RESPONSIBILITY AND ARE THEREFORE MANAGEMENT CONTROLS!

2 3 3 Contemporary limitation of the term -internal control-.

Seen in the light of this theory it is obvious that the contemporary term -internal control- is not only inadequate but completely misleading. Now no longer is control limited to certain spheres such as accounting or administrative control, but it permeates the entire

...../spectrum

spectrum of management's authority and responsibility and thus COVERS THE WHOLE FIELD OF ACTIVITIES.

2 3 4 The objectives of management control

As pointed out above, assets derive income, actively and passively, and therefore the object of all systems of management control is to supervise at the source that assets are utilised to ensure maximum efficiency and to safeguard income. The means to achieve this goal is an enlightened, dynamic and cost conscience MANAGEMENT TEAM to concentrate on sound policy formulation, to lay emphasis on supervision at the source, to delegate authority on a downward scale and to fix responsibilities at the source. In short, it can be submitted that an undertaking is as sound and progressive as its management control allows its management to be. But to this must be added that it is the responsibility of the management team not only to ensure that the necessary systems are installed to meet these imminent needs, but also to utilise fully and act on the information reported.

While growth of an organisation in itself increases the problem of management control, the geographic dispersion multiplies these factors many times. Operating authority moves with the dispersion, and unless effective methods of co-ordination and control are established, there will inevitably be a strong tendency for different operating units to develop along independent lines, and top management will have no assurance that its plans, policies and procedures are being carried out properly. It is here that an analysis must be made of a proper system of internal control. The organisation should be so established that no individual, and no one unit, is in complete control of all phases of a transaction, nor may the individual or unit carry out an assigned responsibility in the business without:-

- a Co-ordinating it with the rest of the business
- b Following prescribed policies and procedures
- c Being responsible for results according to assigned authority
- d Being subject to impartial examination, questions and appraisal by representatives of management

To accomplish this task soundly and reliably, management needs data - facts and figures, economic, physical and financial - to provide a base from which to formulate its plans and against which to exercise control of performance and progress. Such data is the management information that enables management to function scientifically in the sequential action of collating the relevant facts, considering and judging them, determining the conclusion to which that consideration leads, provisionally testing the conclusion, and

...../finally

finally issuing a policy decision in the light of the test. THIS POLICY DECISION BECOMES THE PLAN, and when the performance data reveals deviation from the prognosis, then the policy decision is reviewed in the light of the new facts and revised policy decisions can be scientifically made. The feedback cycle is thus complete.

Because data is of the essence of this action and reaction, management information is commonly spoken of as the -tools- of the management, yet these information -tools- are needed differently in different parts or levels of an organisation, and data procedures have to be appropriately worked out to meet specific requirements. Whether this is considered in theory or in terms of practice, management information is an essential feature of the management process absorbed primarily in the elements of planning and control, with a secondary contribution in co-ordination. In consequence, the procedures designed to give effect to the information, are the means by which the management exercises its judgement in forming decisions: the scope and extent of these are determined by the responsibility (defined) delegated, or allocated, to its role, and are thus reflected by the divisions and levels of the organisation structure. Of managements' decisions some, or many, will be routine, pertinent to the daily or weekly activities under their jurisdiction; if errors of judgement occur here these errors can normally be corrected with little, if any, consequence. Other decisions will refer to major action, and will be ad hoc to situations of importance where errors of judgement could only be capable of correction, either at considerable cost, or not at all. Sound principle therefore requires that DATA AVAILABILITY SHOULD BE APPROPRIATE TO THE SIGNIFICANCE OF THE DECISIONS. Management information is, however, not only specific to each level or section of responsibility as delegated; it is pertinent, too, to the co-ordinated operation of the management process as a whole in a given organisation, especially in regard to the elements of planning and control.

2 3 5 Shifting the emphasis from legalistic rules to empirical hypothesis

The process of transition from conventional cost accounting - historical accounting control - shifts the emphasis from rules to hypothesis, and to achieve scientific and successful management control ACCOUNTANTS, INCLUDING MANAGEMENT ACCOUNTANTS, MUST LEARN TO THINK IN TERMS OF EMPIRICAL HYPOTHESES RATHER THEN LEGALISTIC RULES, i e, STANDARDISED OR NORMALISED RULES.

To be able to do this successfully it is necessary at the outset that full recognition be given to the indisputable fact that ALL CONTROLS - REGARDLESS OF HOW TRIVIAL - ARE MANAGEMENT CONTROLS and further that it is imperative that such controls be fully utilised and consistently applied by management and its deputies.

2 3 6 The definition of management control

Starreveld R W op cit, page 106 acknowledges the wider definition of the American C P A

Handbook which defines internal control as follows:-

Een ruimer begrip

Tegenover deze meer beperkte interne controlebegrippen dient melding te worden gemaakt van een ruimer begrip dat stoelt op het angelsaksische begrip -internal control-, dat in het CPA Handbook als volgt wordt gedefinieerd:

-Internal control comprises the plan of organisation and all of the coordinate methods and measures adopted within a business to safeguard its assets, check the accuracy and reliability of its accounting data, promote operational efficiency, and encourage to prescribed managerial policies-.

Het begrip is ruimer dat het onze in die zin dat het meer omvat dan de confrontatie van norm en werkelijkheid doordat ook de correctieve actie daarin is begrepen.

Zulks is begrijpelijk doordat het Engelse werkwoord -to control- o.m. -beheersen- of -regelen- betekent.

Voor het overige sluiten wij ons gaarne bij de hierboven geciteerde definitie aan. In het bijzonder zouden wij daarbij de woorden plan of organisation and all of the coordination methods and measures willen onderstrepen, aangezien daarmee duidelijk wordt aangegeven dat de interne controle, wat de daarbij aangewende middelen betreft, meer omvat dan de specifieke activiteiten van een verbijzonderd controleorgaan.

Rademan C F O op cit, defines management control, in its broad sense, as the combination of procedures, methods, organisation or functions and other measures by which management:-

- a Keep itself informed of the state of the business
- b Co-ordinates functions
- c Maintains efficient performance
- d Ascertains whether the business is being operated in conformity with established policies
- e Assures itself that objectives are being met.

Rademan C F O further states that management control embraces five elements. If any one of these is lacking, control is not complete. AND INCOMPLETE CONTROL IS DEFECTIVE CONTROL. These forms of control may be described differently, or be located in different places, but they constitute the basic foundation upon which good management rests; and can be tabulated as follows:-

FIVE ELEMENTS OF MANAGEMENT CONTROL

- i OBJECTIVES - ends to be accomplished
- ii PLANS, POLICIES AND PROCEDURES - an outline of how, when, and by whom the objectives are to be attained
- iii TECHNIQUES - premises, planning and budgets, i.e., assumptions as to future facts and conditions interpreted in the light of current actualities
- iv STANDARDS - yardsticks for measuring the results achieved in carrying out the plans, policies and procedures. Comparison is control.
- v APPRAISAL AND EVALUATION OF RESULTS - how well the work is done.

...../Other

Other forms of control are company policies, sound organisation, accounting, cost accounting, planning, forecasting, budgeting, manuals, reports, methods engineering, job analysis, work simplification, work measurement, standards, incentive plans, suggestion plans etc.

2 3 7 The need for prompt and accurate management reporting

Research into exigencies proves that probably the greatest shortcoming in industry today is the sub-standard management reporting systems in use. Management, with the unprecedented growth and geographic dispersion of the large-scale production unit, assumes an ever-increasing degree of responsibility for the OPTIMUM USE AND SAFE-GUARDING OF ASSETS AND INCOME. With this increase of responsibility must, of necessity, come an increase in the nature, range, depth and type of controls at its disposal. Management reporting systems must now provide the basis for prognosis of anticipated conditions more than of past and present situations. These latter are, in fact, pertinent only insofar as they foreshadow the expectation of the future, and allow policy decisions with alternative choices of future action.

2 3 8 Management control is not a new concept

As empirical evaluation of this thesis endorses the fact that it in no way belittles the conception of the control of De Paula, Lancaster and the other pioneers (known as internal control) as it finds that it is still the same - only now re-orientated, revitalised and applied in a manner to befit its new designation MANAGEMENT CONTROL. Therefore much of the data and facts contained and advocated in this thesis, though not new and novel, is pioneering, exploring and probing AN OLD UNIVERSE IN A NEW WAY, endeavouring to provide a SYSTEM OF MANAGEMENT CONTROL GEARED TO MANAGING THE PRESENT ON WHICH THE FUTURE CAN BE BUILT.

In all instances, albeit inextricably interwoven and intertwined to meet the needs of the multi-million Rand largescale production units of today, it must comply fully with the five objectives of internal control firstly by:

- 1 Striving to protect and safeguard assets and income in every possible way;
- 2 Encompassing the production facilities within the purview of the numerical control of units, mass and plant utilisation, thus ensuring the AUTOMATIC promotion of operational efficiency;
- 3 Controlling strictly and reporting positive and negative variances by accountabilities, both in quantity and in value, from the prognosed norm, whereby adherence to prescribed managerial policy is not only enforced, but remedial management policy decisions are facilitated and expedited; and
- 4 Ensuring the strict application of the principle of the division of duties and responsibilities between the transacting, recording, and custodianship functions, to promote the maximum extent of automatic control over the accuracy and reliability

...../of

of the accounting data.

Further, to promote the basic objectives of MANAGEMENT CONTROL the above measures must be applied to ensure:

- 1 That all control measures are absorbed into, and become, an integral part of the homogeneous whole of the activities of the undertaking;
- 2 That control flows into a heterogeneous pattern of differentiation of set functions. Chronologically viewed, these are -
 - a the origin of the managerial or entrepreneurial team;
 - b the postulation of an infrastructure to achieve the goal, whether it be premises, buildings, re-inforcing ancillaries etc.; and
 - c the postulation of potential to provide policy for activities as well as for control measures.

These measures must all culminate in the accounting to management, through accountability, by means of an effective expressway of management reporting so as to ensure the SPECIFIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL FOR INSTANT DECISION AND ACTION BASED ON BOTH EXCEPTION AND OBSERVATION.

Secondly, as final test, the elements of this thesis are subjected to the critical, cold, hard and impartial scrutiny of the audit appraisal. And in full keeping with the objectives of an audit, not only do the criteria - elements - pass the crucial test BUT THERE FLRTHER EMERGES A MOTIVATION COROLLARY COMMON TO THE PROFESSION AND THE THESIS - THEIR MUTUAL AIM TO:-

- 1 Improve performance
- 2 Assist by expediting the ascertainment of the reliability of the financial statements.

The means - management control by any name, method or application. Or stated differently:

-All roads lead to Rome-, as all forms of control have only one goal - the protection and safe-guarding of assets and income and, to the proprietary interests, the achievement of optimum returns at all times.

2 4 The limitations of contemporary cost accounting

Cost accounting is handicapped to a greater extent than normal accounting by the time lag inherent in historic accounting as it deals further in terms of efficiency, time, weight, volume etc., connecting the manufacturing operations with the financial operations by interpreting the former in terms of money. Thus by its very nature and magnitude it

...../increases

increase the normal time lag in order to provide the statistical control data that allows the production unit to be managed on the basis of facts.

2 5 Increase in the size of the undertaking

With the increase in size and geographic dispersion of the production units the task of cost accounting becomes even more complex and the inherent time lag must increase.

So much to that even with full computerisation and modern EDP data capturing and processing installations when results in great detail exactly compiled in all aspects are published, these are history and of practically no use whatever as a basis for dynamic policy formulation. Thus one of the most valuable techniques is becoming obsolete.

2 6 Factors that influence management information and control systems in basic industries such as steelmaking

2 6 1 The very nature of an integrated steel plant denotes the enormous capital investment in fixed assets alone. With Iscor's new Plant at Newcastle, it was estimated in 1971 that this expansion would necessitate capital expenditure to the order of some R400 million. This indicates the complexity and extent of the requirements of a successful and dynamic management information system to control and co-ordinate such a vast undertaking.

cf Heyman C G -Die vraagstuk van die ontwerp en kosprys van staaloonde in die republiek van Suid-Afrika - An unpublished Doctor's Thesis (PU vir CHO). (1973).

2 6 2 Fluctuations in demand - the additional impact of the Keynesian accelerator and multiplier principles

Demand is determined by the business climate of a country in general, and by sectors of the economy, such as the motor industry and the construction industries, in particular. The production facilities for steel, like agriculture, are fixed in the medium to long term. Thus it is vital for a management information system

...../to

to provide scientific data for forecasting and prognosis of future market conditions based not only on the present and past, but also on varying levels of production.

2 6 3 Uneconomical production batches and diversification

cf Drucker P F (1974) op cit, page 664 states that in certain industries the minimum viable size for a business is very large. It is almost as impossible under conditions of present-day technology to be a -small steel company- as it is to a -small army-. On page 695 Drucker further states that it is the customer that decides what is the market rather than the manufacturer.

Brech E F L (1966) op cit, page 633 states that manpower difficulties have heightened the trends; so, too, has the process of automation in factory processes. The heavy expenditure necessary to instal this mechanisation and automation has increased the fixed charges which a company will have to cover, and this has made it doubly important for total sales and total production to be maintained at a consistently high level. As a result companies have tended to DIVERSIFY as well as to specialise, by making and selling various classes of goods, by putting eggs into more than one basket. By this means, it is hoped that even if demands follows a cyclical pattern, the peaks and troughs will not occur at the same time.

Due to the enormous capital investment in plant, fixed and semi variable costs predominate in the cost structure. A management information system must therefore be elastic and not only facilitate compilation of prognosed costs at varying levels of production, but also provide the means of establishing the economics of forced selling - dumping - on foreign markets.

2 6 4 The controlled price of steel and the spiralling cost structure

In the Steel Industry, more so than in other industries, there is a critical time lag between rising costs and price increases due to price control.

Thus overheads and indirect expenses must be strictly controlled and, as comparison is control, the management information system must provide regular monthly comparison and measurements of variances from the set norm - budgetary control!

2 6 5 Shortage of skilled labour - professional and clerical

Professionally and academically qualified administrative and clerical staff are at a premium and, in the main, unobtainable. This is a factor which prejudices the successful operation of any management information system,

3 Is an in-house, cost intensive, fully automated, computerised management information system the answer?

3 1 The shift in the emphasis of management control

Brech E F L (1966) op cit, page 633 states that the trends of development in industry and business during the past decade or so have been such as to place increasing emphasis on the techniques of planning and control as tools- of management, whether in marketing, in manufacturing, in the maintenance of equipment, or in the central administrative systems of a company. Manpower difficulties have heightened the trends; so, too, has the progress of automation in factory processes. The heavy expenditure necessary to instal and maintain this mechanisation and automation has increased the fixed charges which a company will have to cover, and this has made it doubly important for total sales and total production to be maintained at a consistently high level.

In the wake of the management control information explosion of the sixties, came the unprecedented increase in the demand for the collection, collation and presentation of pertinent data as the basis for scientific management policy-making decisions. Forcibly, indeed, came the awakening that accounting control with its inherent time lag in presentation, was now not only wholly inadequate, but completely misleading, when dynamic management endeavoured to prognose future conditions and policy decisions based on historical recording. It was further realised that administrative control, as defined, known and accepted, was lacking in the very basic qualities that scientific management policy formation was dependent on. But in no way whatever are we belittling these divisions of control. What was true of them a decade ago has not decreased in importance. On the contrary their importance has increased proportionately with the increase in size, spread and geographical dispersion of the undertaking.

It is just that the increase in the importance of management control has far outstripped the other two. In fact, it would probably be no exaggeration to say that the importance of management control has increased in a geometric progression with the increase in size, spread, and geographic dispersion of the undertaking.

And, axiomatically, it follows that the future, with its everincreasing capital-intensive

...../undertakings

undertakings, must follow on the same lines until, it is respectfully submitted here, the success or failure of an undertaking will be determined, not only by the degree of accuracy, efficiency and effectiveness of management policy decisions. BUT BY THE SPEED WITH WHICH SUCH POLICY FORMULATIONS CAN BE EFFECTED AND TESTED. Following this logic to a rational conclusion, the shift in the emphasis of internal control, as illustrated, becomes obvious.

3 2 The aspect of management information

It is in the area of the utilisation and disposition of resources, and the assessment of the outcome from their application, that the judgement/decision aspect of the management control process comes most into play.

To accomplish this task soundly and reliably, management needs data - facts and figures, economic, physical and financial, to provide a base from which to formulate plans against which to exercise control of performance and progress. Such data is the management information that enables management to function scientifically in the sequential action of collating the relevant facts, considering and judging them, determining the conclusion to which that consideration leads, provisionally testing the conclusion, and finally issuing a policy decision in the light of the test.

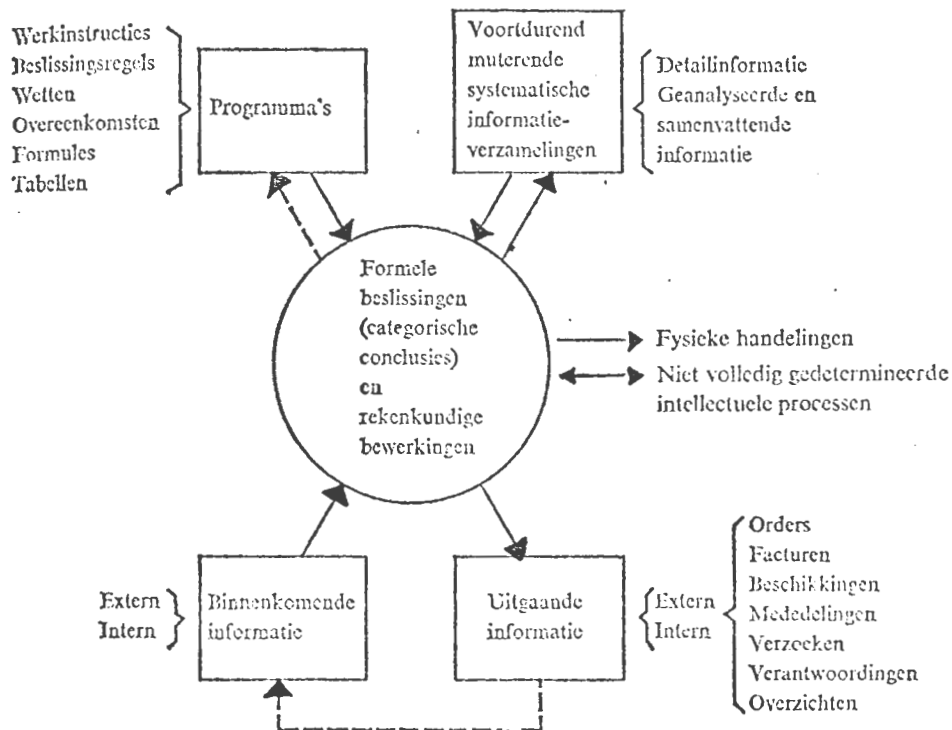
Kelly J (1968) page 6 considers that a policy instruction is quite simply a communication from a manager to any or all of his subordinates, stating the policies which they must observe. This in 1968 only appears to identify policy with instruction!

cf Kelly J -Is scientific management possible? Faber and Faber Limited, London 1968.

THIS POLICY DECISION BECOMES THE PLAN, and when the performance data reveals deviation from the prognosis, then the policy decision is reviewed in the lights of

...../the

the new facts and revised policy decisions can be scientifically made. THE FEEDBACK CYCLE IS COMPLETE. Starreveld R W op cit, page 19 depicts this cycle as:



Schematische voorstelling van het grondpatroon van vrijwel alle informatieverwerkingsprocessen

Because data is of the essence of this action, and reaction, management information is commonly spoken of as the -tools- of management, yet these information -tools- are needed differently in different parts, or levels, of an organisation, and data procedures have to be appropriately calculated to meet specific requirements. Whether considered in theory or in terms of practice, management information is an essential feature of the management process absorbed primarily in the elements of planning and control, with a secondary contribution in co-ordination. In consequence, the procedures designed to give effect to the information are the means by which management exercises its judgement in forming decisions: the scope and extent of these are determined by the responsibility (defined) delegated, or allocated, to their role, and are thus reflected by the divisions and levels of the organisation structure. Of management's decisions,

...../some

some or many will be routine, pertinent to the daily or weekly activities under their jurisdiction; and if errors of judgement occur here these can normally be corrected at a low cost.

Other decisions will refer to major action, and will be ad hoc to situations of importance where errors of judgement could only be capable of correction, either at considerable cost or not at all. Sound principle therefore requires that DATA AVAILABILITY SHOULD BE APPROPRIATE TO THE SIGNIFICANCE OF THE DECISIONS.

cf Brech E F L - The principles and practices of management. Longmans, Green and Co, London (1966).

Starreveld R W (1972) op cit, page 72 states:

Dat het in dergelijke gevallen om een informatieveredelingsproces gaat, dat technisch niet kan worden onderscheiden van andere informatieveredelingsprocessen, is een inzicht dat eerst na 1950 duidelijk naar voren is gekomen.

In dit verband willen wij in het bijzonder melding maken van een publikatie van HERBERT A SIMON getiteld „The New Science of Management Decision“ (New York 1960).

Na te hebben uiteengezet dat „decision making“ drie fasen omvat, t.w.

- Het constateren of opsporen van zaken waaromtrent een beslissing moet worden genomen (intelligence activity)
- het opperen van mogelijke oplossingen (design activity)
- het kiezen uit de geopperde mogelijkheden (choice activity)

geeft de schrijver van genoemd boek het op pag, 74 afgedrukte overzicht van de verschillende middelen die in het beslissingsproces kunnen worden aangewend.

On page 74 Starreveld R W (1972) op cit, distinguishes between traditional and modern

decision techniques as follows:

Traditionele en moderne beslissingstechnieken (ontleend aan Herbert A. Simon „The New Science of Management Decision“ New York 1960)

Soorten beslissingen	Beslissingstechnieken (c.q. middelen)	
	Traditionele	Moderne
Geprogrammeerde: Routinebeslissingen, regelmatig terugkerende beslissingen Leiding ontwikkelt specifieke processen voor het nemen van deze beslissingen	1. Gewoonte 2. Geformaliseerde routine: standaard procedures 3. Organisatiestructuur Gemeenschappelijke verwachtingen Een systeem van subdoeleinden Geordende informatiekkanalen	1. Operations Research Mathematische analyse Modellen Simulatie m.b.v. computer 2. Elektronische informatieverwerking
Niet geprogrammeerde: Eenmalige en moeilijk te structureren nieuwe beleidsbeslissingen Worden genomen door algemene probleemoplossingsprocessen	1. Gezond verstand (ervaring en inzicht) intuïtie en creativiteit 2. Vuistregels 3. Selectie en training van leiders	Heuristische* probleemoplossingstechnieken, toegepast op: (a) training van menselijke beslissers (b) constructie van heuristische computer-programma's

*) Heuristiek = Leer van het vinden (Eureka!)

Management information is, however, not only specific to each level or section of responsibility as delegated; it is pertinent, too, to co-ordinated operation to the management process as a whole within a given organisation, especially in regard to the elements of planning and control.

3 3 The vulnerability of computerisation and the scope for:-

3 3 1 Deliberate manipulations

With the advent of automation, the electronic brain, and all its consequent benefits, there has come a new threat of a loss potential on such an unprecedented scale that even the greatest protagonists of computerisation have been staggered. The denizens of the -electronic- underworld - the computer criminals - have emerged. Armed usually with nothing more lethal than a degree in advanced electronics, these computer criminals have launched, in this decade, a wave of electronic breaking and entering that is costing conglomerates and corporations uncounted millions in goods, services and hard cash. In fact it is no exaggeration to say that individuals have used their electronic abilities to become millionaires almost overnight. Defalcations are now not only more abysmal, but more rife - a far cry indeed from the -petty cash fiddlers- of yesteryear. To substantiate this statement let us review some of the recent KNOWN instances in the U S A. viz:-

cf Sunday Business Times 17th June, 1974 - 'After the next big theft
CHERCHEZ le COMPUTER'

(1) Insurance - Equity Funding scandal

Dummy life insurance policies, ostensibly worth millions of rand, were programmed into a company computer and accepted as legitimate by the auditors.

(2) Banking - New York Union Dime Savings Bank

The chief teller misappropriated R1 million over three years by manipulating inactive accounts in the bank's computer.

(3) Industry - Salinas California

The company accountant systematically embezzled R700 000 over six years by recording higher payments for raw materials in the inhouse computer than the company actually paid. He arranged for the computer to credit the excess to his own dummy companies, and then programmed for him to be advised how much money he could withdraw from these companies at particular times WITHOUT RAISING SUSPICION.

In the above we have selected one brief example from each particular group. The most disturbing aspect of these deliberate manipulations was the fact that majority of the culprits were only CAUGHT BY ACCIDENT.

What makes computer criminals so hard to catch is the extraordinary complexity of the programmes themselves. Many of these programmes are so intricate that human beings cannot handle them once they have entered the computer. The programmes are designed to be self-contained. They automatically tell the computer to stop and start, and even to find errors and rectify them, often through the Console, and thus without producing any written printout to record such actions. The only sure way of detecting manipulations of programmes would be to devise another computer programme capable of auditing the machine's internal operations.

But, to quote, Weill W of Honeywell information Systems Incorporated, -Unfortunately no one in computer research today knows how to write such a programme! For the time being WE ARE RESTRICTED TO IMPROVING THE SECURITY SYSTEMS INSIDE THE ELECTRONIC DATA PROCESSING DEPARTMENTS-.

cf Cherchez le Computer IBID

Oakes R of Washington goes so far as to say that the one ray of hope companies have discerned is that a number of computer criminals, it seems, are quite prepared to turn their talents back into legitimate channels. Thus an -electronics expert- in Los Angeles, having served forty days for his thefts from Pacific Telephone and Telegraph, is now back in business - THIS TIME AS A CONSULTANT, ADVISING CLIENTS ON HOW TO SECURE THEIR COMPUTERS AGAINST ILLEGAL ENTRY!

3 3 2 Innocent transgressions

Even in the most sophisticated, full automated management information systems errors occur in which there is often only a very fine dividing line between comedy and pathos. The reporting error humorous - the result, pathetic and often tragic. What better illustration can there be of this than the Pennsylvania Grand Central Railroad Corporation?

cf Business of South Africa - Volume 7, No. 6 - June, 1972.

During the few months PRIOR TO THIS COMPANY'S BANKRUPTCY the management information services - fully automated - achieved the following:-

- (1) Lost track, without reporting, of several hundred apparently fully laden freight trucks - the standing joke in Wall Street at the time being that the freight trucks were not -lost- but STOLEN.

- (2) Freight charges were either not debited, or were incorrectly debited, and not followed up.
- (3) Reported immediately as -lost- an entire train replete with passengers and crew.
- (4) Consignor's or consignees were unable to locate or trace consignments. Were perishables eventually located by -smell-?
- (5) Trains were scheduled incorrectly - with somewhat startling results.
- (6) Warehousing and leasing costs tripled without management being informed.

In short, management policy making decisions were formulated on incomplete and misleading data, either incorrectly reported, or not reported at all.

The result was chaos, bankruptcy and enormous losses to the proprietary interests. This example emphasises yet again that scientific and correct management policy making decisions determine not only the extent of the success of an undertaking, but also its ability to stay in business; that scientific and correct policy decisions are dependent on an efficient and effective system of static and dynamic control with the inlet to the highway of scientific management control being SWIFT POLICY DECISIONS BASED UPON EXPRESS REPORTING; that the means to the end - the tools and techniques of management - are as important as the end - the profit motive.

4 The motivation for this thesis

The motivation for this thesis arises from an awareness of the following:-

4 1 THE SHORTCOMINGS OF CONTEMPORARY MANAGEMENT INFORMATION SYSTEMS and the

urgent need for a complete re-orientation in the thinking on, and approach to, the principles of management control. (There is at present not even a proper definition of management control).

Management information systems are today highly automated and involve enormous capital outlays. In many instances they cost as much to acquire and to operate as do sections of a plant and, as such costs are indirect and are not represented by production other than that of control data, it is essential that their utility must be compatible with their cost. Further these installations must be so

...../designed

designed and implemented as firstly, to afford, the maximum control for the undertaking as a whole and, secondly, to facilitate express reporting NOT of masses of information, but of variances from the norm. Yet they must be so geared as to provide the means for compilation and interpretation of detailed information should the need therefor arise. Managements often err in thinking that a cost intensive, highly sophisticated and automated system of collection, collation and dissemination of data will make decisions for them and automatically give answers. Not so!

cf Garbage in - garbage out; an old computer saying

This outlook loses sight of the essential basic fact that before they can have a good management information system - M I S - they must have an efficient and scientific system of management control.

Such a scientific and efficient system of management control is the foundation of any automated M I S. Furthermore, M I S is nothing other than a tool or technique of management. In other words if scientific control does not exist within the framework of a good organisation structure the deficiencies cannot be cured by the degree of sophistication in computer-based information systems. Automation cannot manage for managements. INFORMATION IS THE RAW MATERIAL OF DECISION-MAKING, AND IF INFORMATION IS NOT BEING GENERATED, DISSEMINATED, AND USED FOR MANAGERIAL CONTROL AND PLANNING, NO SYSTEM, MANUAL OR AUTOMATED, WILL CURE THE DEFICIENCY.

It is gratifying to observe that Ross J acknowledges the vitalness of the management control propounded herein - albeit in different words - when he states -The reasons for M I S planning are the same for planning in general:-

4 1 1 Planning offsets uncertainty

- 4 1 2 Planning improves economy of operations
- 4 1 3 Planning focuses on objectives
and
- 4 1 4 Planning provides a subsequent device for CONTROLLING ALL OPERATIONS.

cf Ross J -An article adapted from Management in Crises - soon to be published in the U S A.

Ross J further states that management's romance with computers and management information services is over. New systems must justify their cost and performance! In a subsequent article he acknowledges that the problem surrounding better utilisation of automated M I S is twofold. Firstly, automated management reporting systems must enable better decision making so as to advance the frontiers of management decisions from routine applications to management application proper - SWIFT POLICY DECISIONS BASED UPON EXPRESS REPORTING!

Petrof J V, Carusone P S and McDavid J E page 4 state that successful practitioners and students of management have defined the subject in many ways.
-DECIDING how to get things done through people-. DECIDING on how to guide an organisation toward its predetermined objectives, and -making DECISIONS about alternative courses of action- are only a few of their definitions (the emphasis is added). It would be too exhausting to the reader to have them all enumerated, but the observant reader will have noticed that it is very difficult to describe or define management adequately without the word DECISION. In many ways decision making is the purpose, the specialisation, and the end product of the manager. INDEED IT IS THE REASON FOR HIS VERY EXISTENCE AS A MANAGER. IT IS MANAGEMENT WHICH MUST DECIDE IN EVERY INSTANCE. DECISION MAKING PERVADES ALL THE FUNCTIONS AND ACTIVITIES OF THE MANAGER, AND IT IS THE END PROCESS IN THE EXERCISE OF HIS MANAGERIAL AUTHORITY AND RESPONSIBILITY.

cf Petros J V, CHRUSONE P S and McDAVID J E - Small business management: concepts and techniques for improving decisions - McGRAW - Hill Book company New York 1972.

Secondly, it is becoming vitally necessary to design and instal such systems at a cost compatible with the economics thereof.

cf Business South Africa, Volume 7, No. 6 June, 1972 - Why Computers fail.

The failure to solve this twofold contemporary problem can be traced, in general, to:-

- 4 1 5 The confusion between a management system and a management information system
- 4 1 6 Lack of management understanding and involvement in systems design
- 4 1 7 The communication gap between management and the automation expert
- 4 1 8 Failure to organise and ensure full utilisation of reporting facilities.

cf Sutherland Beau; Have computers benefited AFROX? Extract of an article in Business South Africa, January, 1974. -Either we, the senior management, had to lead the D P function and thus plan for it, or else abdicate our responsibilities and let the D P function lead us, and inevitably waste our company resources - there is no intermediate course of action-.

4 2 THE INFERIOR STANDARDS OF CONTEMPORARY MANAGEMENT REPORTING SYSTEMS which, due to inherent inconsistencies etc., often hamper instead of assisting the dynamic management decision making aspect. These reporting systems usually have the following characteristics in common:

4 2 1 They are subject to the time lag inherent in historical recording and endeavour to offset this disadvantage by using sophisticated cost intensive automated equipment. This in itself creates a further problem - the availability and cost of such specialised staff to operate the equipment. They are usually highly skilled technical staff with little, if any, knowledge of accounting or cost accounting.

4 2 2 They face innumerable difficulties in the interpretation and the form of the data compiled. In most instances the print-outs as presented have to be translated and retabulated before being tendered to the user - a user, who in many instances, does not understand the set-out. This disadvantage applied proportionately from top management right down to shop floor level. A further factor which accentuates the problem of computerisation is that data is not immediately -visible-, i e, it is stored in memory. For many applications such as wages and fixed assets accounting, this presents no difficulty. But for cash books, general ledgers, stores and perpetual inventory control, serious problems can arise and compromises must be made in the interests of the efficient and scientific operation of the management information system.

4 2 3 It is still generally accepted that any scientific management information system is either one entirely apart from the financial administration or accounts

...../department

department of an organisation, or is a cost accounting system completely integrated with, and dependent on, the financial or pure accounting function. In some instances managements are still endeavouring to operate on standard costing installations that, in common with the standard costing concept as a whole, have been obsolete for some two decades or more.

4 2 4 There is a considerable time lapse between the month or period end and the reporting aspect. A survey has revealed that on average, some twenty-one days elapsed from the end of the reporting period to the reported information. In some instances the time lag was six weeks.

4 2 5 Usually masses of data are reported on. Such masses consist of both non-deviations and deviations from the set norm. Important deviations are obscured by non-deviations, and often the reader misses the points that the statements laboriously highlight. One of the greatest disadvantages of such a massive management information system is the psychological aspect that the bulk of the reported information frightens off many users of the information.

4 2 6 Internal control is of only secondary importance in contemporary management information systems.

4 3 THE VITAL NECESSITY FOR MANAGEMENT CONTROL as the axis that the spectrum turns on. As all the forms of control have only one goal - the protection and safeguarding of assets and income and the achievement of optimum returns at all times - and are all management controls, management assumes full responsibility therefor.

But management, owing to the multiplicity of measures entailed, cannot exercise personal supervision over all levels and branches of the undertaking's activities, and must DELEGATE authority and responsibility in a descending order of seniority. The main goal in their exercise of control is to cover the whole field of activities, i.e., to supervise that assets are used in pursuance of the objectives of the undertaking, and are accounted for accordingly, and that income is earned with the maximum economy in the application of the assets. The means to achieve this is a scientific system of internal control consistently applied to enable management to fulfil its control function

...../over

over both policy making and the ascertainment of the extent to which subordinates have successfully carried out instructions, and that maximum returns through optimum utilisation of the productive facilities have been achieved.

To attain this goal management has at its disposal a whole series of techniques and aids, embracing all activities from the production stage to the ultimate sale. These include the setting of specific goals, the planning and organisation of policy and procedures to attain these goals, the creation of means to put such policy and procedures into effect, the measurement of the results against specific standards, and the determination of the degree of success of the whole range of activities. In the implementation of such a system of control the emphasis necessarily falls on supervision, and the basis of effective supervision is that it be carried out at the source.

4 4 THE NEED FOR THE RE-ORIENTATION OF MANAGERIALS IN THEIR APPROACH TO CONTROL

The need for this change is so pressing that it must be brought to everyone's attention.

It is a prerequisite for successful and scientific operation of reporting and accounting systems that these installations be founded on the following premises:

4 4 1 INTERNAL CONTROL CONSISTS OF ALL THE MEASURES ADOPTED TO SAFEGUARD ASSETS AND INCOME, AND TO ENSURE OPTIMUM UTILISATION OF THE PRODUCTION FACILITIES AT ALL TIMES AND AT ALL LEVELS OF OPERATION, and is, ipso facto, A MANAGEMENT CONTROL. As such it encompasses the same company-wide sphere covered by management authority and responsibility, and is not, as is still a popular conception with many, limited to certain spheres only such as accounting or administrative control.

4 4 2 All forms of control must have only one goal - the protection and safeguarding of the assets and income and the achievement of optimum returns at all times.

4 5 THE NECESSITY FOR SCIENTIFIC MANAGEMENT CONTROL

All controls are management controls, and management must assume full responsibility

...../therefor.

therefor. But as management, owing to the multiplicity of measures entailed, cannot exercise personal supervision over all levels and branches of the undertakings activities, it must DELEGATE authority and responsibility in a descending order of seniority. The goal in the exercise of control is therefore to cover the whole field of activities i e, to supervise that assets are used in pursuance of the objectives of the undertaking and are accounted for, and that income is earned with the maximum economy in the application of the assets. The need for a system of internal control is thus obvious as it is the most important aid at the disposal of the management in the fulfilment of its control function over both policy making and the ascertainment of the extent to which subordinates have successfully carried out instructions, and to what extent they have achieved maximum returns through optimum utilisation of productive facilities. Rademan C F O op cit, forecasts that the success or failure of an undertaking will be determined in the future, not only by the degree of accuracy, efficacy and effectiveness of management policy decisions, but also by the rapidity of reporting on which management bases its policy decisions. Following this hypothesis to its logical conclusion it becomes increasingly clear that swift policy decisions based on express reporting - the inlet to the highway of scientific management control - is the key to success. And to achieve this the basic objectives of internal control must be applied and promoted as to ensure:-

cf AS THIS APPLICATION AND PROMOTION IS THE BASIS OF COSTFINDING IT IS AGAIN STRESSED HERE.

4 5 1 That all control measures are absorbed into an integral part of the homogeneous whole of the activities of the undertaking;

4 5 2 That control flows into a heterogeneous pattern of differentiation of set functions.

Chronologically viewed:

- (a) the origin of the managerial or entrepreneurial team;
- (b) the postulation of an infrastructure to achieve the goal, whether it be premises, buildings, re-inforcing ancillaries etc; and

- (c) the postulation of potential to provide policy for activities as well as for control measures.

These measures all culminate in the accounting to management, through accountability, by means of an effective expressway of management reporting by the SPECIFIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL FOR INSTANT DECISION AND ACTION BASED ON BOTH EXCEPTION AND OBSERVATION.

Finally in conclusion, the motivation for this thesis is therefore the following:-

- 1 The shortcomings of contemporary management information systems.
- 2 The inferior standards of contemporary management reporting systems
- 3 The vital necessity for management control
- 4 The need for the re-orientation of managements in its approach to control
- 5 The necessity for scientific management control

The arrangement of the thesis

The thesis is divided into three sections.

SECTION I

This section consists of Chapter 1 and 2.

Already in the introduction the scope and purpose come to the fore. The shortcoming of contemporary management information systems and the urgent need for simplification and reform emerge as one of the motivations of the thesis.

At the outset it is illustrated that there is a stream of startling new phenomena manifesting itself to constantly challenge the ability of management to manage, and the effectiveness of control.

The answer to the problem-intensive seventies? CONTROL! But not in the -dress- of yesteryear. An internal control, re-orientated in its thinking and flow, having been revitalised with a -shot in the arm- of the -live- supervision at the source requirements of the space age of today resulting in the emergence of a management control that is armed to cope with a dynamic contemporary business world.

In the first chapter management control is unequivocally defined, and its scope, origin and

application are set out, with the twin or dual streams of control, as propounded, now expanded in breadth and in depth to form the foundation for all systems of control - the controls where, interwoven in every phase of the transacting, recording and custodianship functions are basic, built-in automatic divisions of the twin or dual streams of static and dynamic control; controls which, negative or positive, tangible or intangible, real or psychological, permeate the spectrum to form the umbrella that safeguards, guides and protects the undertaking.

Chapter 2 deals with costfinding and the need for express management reporting. Research into exigencies has proved that probably the greatest shortcoming in industry today is the sub-standard management reporting systems in use. Management, with the unprecedented growth and geographic dispersion of the large scale production unit, assumes an ever-increasing degree of responsibility for the OPTIMUM USE AND SAFEGUARDING OF ASSETS AND INCOME. With this increase of responsibility must of necessity come an increase in the nature, range, depth and type of controls at its disposal. Thus was costfinding born as a tool or technique of management controls to aid management by facilitating SWIFT POLICY DECISIONS BASED ON EXPRESS REPORTING - THE INLET TO THE HIGHWAY OF SCIENTIFIC MANAGEMENT CONTROL - AND FOUNDED ON EFFECTIVE STATIC AND DYNAMIC CONTROL.

These two chapters define the objectives that contemporary large-scale industry should strive for.

SECTION II

This section consists of chapters 3 to 7 and deals, albeit very briefly, with empirical aspects of the management control through costfinding systems installed in the Dunswart Iron and Steel Works Group. It reviews the prevailing conditions that necessitated the help of management consultants and the factors that finally led to the choice of the combination of conventional accounting machines and computerisation. In chapters 6 and 7 costfinding in action is reviewed.

SECTION III

Chapter 8 concludes this thesis and the inference is that it in no way belittles the conception of the control of De Paula, Lancaster and the other pioneers, as it finds that control is still the same - only now re-orientated, revitalised and applied in a format and manner to befit its new designation of management control! Further the empirical evaluation endorses that much of the data and facts contained and advocated in this thesis, though not new, is pioneering, exploring and probing. AN OLD UNIVERSE IN A NEW WAY and endeavouring to provide a SYSTEM OF INTERNAL CONTROL GEARED TO MANAGING THE PRESENT ON WHICH THE FUTURE CAN BE BUILT. The importance of this chapter must be seen in two parts. Firstly, an evaluation of the data justifies the opinion that the criteria and the implemented system revolve around and satisfy the basic objectives of internal control. In its wider sense it recognises management control as a super tool for achieving results particularly in respect of express reporting by means of dual controls. In all instances there is full compliance in every sense with the five objectives of internal control insofar as all elements:-

1. Strive to protect and safeguard assets and income in every possible way
2. Encompass the production facilities within the purview of the numerical control of units, mass and plant utilisation, thus ensuring the AUTOMATIC promotion of operational efficiency.
3. Control strictly and report positive and negative variances, by accountabilities, both in quantity and in value, from the prognosed norm thus ensuring that adherence are facilitated and expedited.
4. Ensure the strict application of the principle of the division of duties and responsibilities between the transacting, recording and custodianship function in order to provide the maximum extent of AUTOMATIC control over the accuracy and reliability of accounting data.

And, these elements must all promote the basic objectives of internal control by being so applied as to ensure:-

1. That all control measures are absorbed into an integral part of the homogeneous whole

of the activities of the undertaking;

- 2 That control flows into a heterogeneous pattern of differentiation of set functions.

Chronologically viewed, these functions are:

- a The origin of the managerial or entrepreneurial team;
- b the postulation of an infrastructure to achieve the goal, whether it be premises, buildings, re-inforcing ancillaries etc; and
- c the postulation of potential to provide policy for activities as well as for control measures

These measures all culminate in the accounting to management, through accountability, by means of an effective expressway of management reporting by THE SPECIFIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL FOR INSTANT DECISION AND ACTION BASED ON BOTH EXCEPTION AND OBSERVATION.

In the second part, as final test, the elements of this thesis are subjected to the critical, cold, hard and impartial scrutiny of the audit appraisal. And in full keeping with the objectives of an audit, not only do the criteria - elements - pass the crucial test BUT there further emerges a motivation corollary common to the profession and the thesis - their mutual aim to:-

- 1 Improve performance
- 2 Assist by expediting the ascertainment of the reliability of the financial statements

The means - management control by any name, method or application.

MANAGEMENT CONTROL

ITS SCOPE, ORIGIN, DEFINITION AND APPLICATION

(pages 11 - 116)

CHAPTER I

INDEX

- 1 The object of scientific management is to safeguard assets and income and to ensure optimum returns at all times.
- 2 The definition and scope of management control.
- 3 The need for scientific control.
- 4 The basis of all controls is supervision at the source.
- 5 The application of the basic objectives of internal control.
- 6 The importance of scientific policy formulation and decision making.
- 7 Scientific policy decisions depend on the efficacy and speed of reporting.
- 8 Internal control as a technique of contemporary management.
- 9 Scientific control has two aspects.
 - i Near automatic and basic
 - ii Dynamic management
- 10 Scientific management is the art of doing the right thing at the right time and place through effective communication and control.
- 11 The evolution of the philosophy that swift policy decisions based upon express reporting is the inlet to the highway of scientific management control.

1 MANAGEMENT CONTROL - ITS SCOPE ORIGIN, DEFINITION AND APPLICATION

A formal approach and basic definition as applied in the remainder of this thesis.

In every undertaking, no matter in what industry or sphere of activity, it is from the assets of the undertaking that its income is derived, and, as the management is solely responsible for the undertaking's financial performance, growth, and continued prosperity, its objective, of necessity, is to safeguard assets and income and to ensure the optimum utilisation of the production facilities at all times and at all levels of production. As control consists of all the measures adopted by management to achieve this objective, such measures automatically encompass the same sphere as is covered by management's authority and general responsibility and are MANAGEMENT CONTROLS. It is therefore obvious that the term internal control is contemporaneously not only inadequate, but misleading. Now no longer is control, as is still a popular fallacy, limited to certain spheres only such as accounting or administrative control, but it is permeating the spectrum to COVER THE WHOLE FIELD OF ACTIVITIES.

Internal Control: A study of its historical developments, contemporary concepts and imminent needs to suffice modern demands - Page 1 An unpublished Master's dissertation (Unisa).

Starreveld R W (1972) op cit, page 106 and 107 accepts that:

-Internal control comprises the plan of organisation and all of the coordinate methods and measures adopted within a business to safeguard its assets, check the accuracy and reliability of its accounting data, promote operational efficiency, and encourage adherence to prescribed managerial policies.-

But he states that internal control must be further divided into the following seven CONTROL FUNCTIONS.

- 1 VERWACHTINGSCONTROLE
- 2 BELEIDSCONTROLE
- 3 UITVOERINGSCONTROLE

- 4 BEVOEGHEIDSCONTROLE
- 5 VOORTGANGSCONTROLE
- 6 EFFICIENCY-CONTROLE
- 7 NORMCONTROLE

This is a far cry indeed from the internal check techniques of the past.

Now as all forms of control have one goal - the protecting and safeguarding of the assets and income and the achievement of optimum returns to the undertaking at all times - and are management controls, management assumes full responsibility for them. But owing to the multiplicity of measures entailed management cannot exercise personal supervision over all the levels and branches of the undertaking's activities, and it must DELEGATE its authority and responsibility in a descending order of seniority. The object of its exercise of control is to cover the whole field of activities of the undertaking, i e, to supervise that the assets are used in pursuance of the objectives of the undertaking and are accounted for accordingly, and that income is earned with the maximum economy in the application of the assets.

It thus becomes obvious that a system of management control that is scientifically and consistently applied, is the most important aid at the disposal of management for the fulfilment of its control function over policy formulation, and the ascertainment of the extent to which subordinates have successfully carried out their instructions and to which maximum returns through the optimum utilisation of the productive facilities have been achieved.

To attain this goal management has at its disposal a whole series of techniques and aids which embrace all activities from the production stage to the ultimate sale. These techniques include the setting of specific objectives, the planning and organisation of management policy and procedures, the creation of the means to put such policy and procedures into effect, the measurement of the results against specific standards, and the determination of the degree of success of the whole range of activities.

In the implementation of the system of control the emphasis will necessarily fall on SUPERVISION and the basis of effective supervision is that it is carried out at the source.

Drucker P F (1974) op cit, in his entire work makes no mention of supervision as a basic requirement of scientific management. Drucker only refers to supervision.

Rademan C F O op cit, states that the success or failure of an undertaking will be determined in the future not only by the degree of accuracy, efficacy and effectiveness of management policy decisions, but also by the rapidity of the reporting on which management bases its policy decisions.

Reeser C (1973) op cit, page 31, states in the section - Management and Mathematics - that if the mathematical school's salient characteristics can be singled out, however, they are its focus on optimal decision making and its requirements for descriptive and predictive models. In the section - Optimisation - Reeser further states that to the disciples of this, Management being constantly faced with problems for which solutions must be decided it is held that there exist many alternative solutions for every problem. The challenge to the manager is to assemble every possible solution to a given problem, and from this array select the one that WILL BE MOST EFFECTIVE IN TERMS OF ACCOMPLISHMENT AND MOST EFFICIENT IN TERMS OF THE COSTS REQUIRED RELATIVE TO THE RESULTS ACHIEVED. AN OPTIMAL DECISION IS THE CHOICE OF THE BEST WAY TO SOLVE THE GIVEN PROBLEM.

Following this hypothesis to its logical conclusion it becomes increasingly clear that swift policy decisions based on express reporting - the inlet to the highway of scientific management control - is the key to success.

Petrof J V, Carusone P S and Mc David J E (1972) op cit, page 4 and 5, agree fully that the decision making function is a vital aspect of contemporary scientific management. They state that in many areas of life it does not matter if a man resists making a decision until the inevitability of the situation forces him into a choice based on impulse rather than on facts and logical thinking, but in the area of business this can be disastrous. To paraphrase an old saying, the road to bankruptcy is paved with good intentions and BAD DECISIONS.

From a management viewpoint a decision involves making a choice among alternative courses of action. Without decisions no business can operate since all business actions are the consequence of some management decision. Even inaction itself is the result of a decision. Decision making is essentially a stream of interrelated, sequential, and concurrent choices. One decision often leads to another or even forces another on the manager. Decisions arrived at today have been influenced by those made in the past and in turn they will effect future decisions.

To comply with these requirements the basic objectives of internal control must be applied and promoted as to ensure:-

- 1 That all control measures are absorbed into, and become, an integral part of the homogeneous whole of the activities of the undertaking:
- 2 That control flows into a heretogeneous pattern of differentiation of set functions.

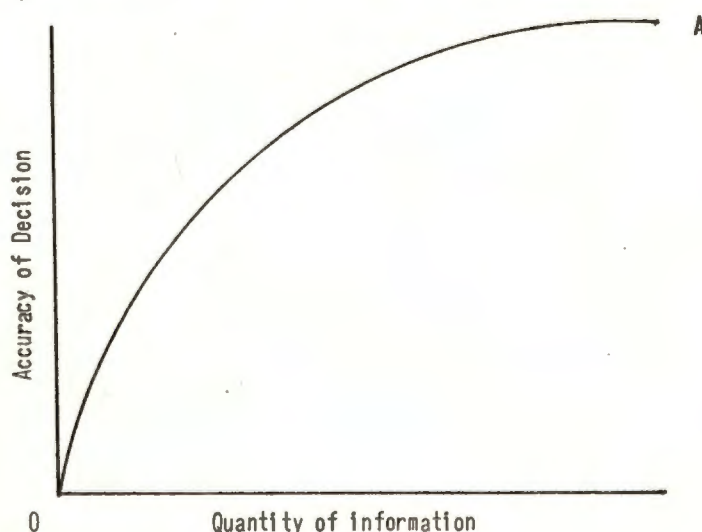
Chronologically viewed these are:

- a the origin of the managerial or entrepreneurial team;
- b the postulation of an infrastructure to achieve the goal, whether it be premises, buildings, reinforcing ancillaries etc; and
- c the postulation of potential to provide policy for activities as well as for control measures.

All these culminate in the accounting to management, through accountability, by means of an effective expressway of management reporting so as to ensure THE SPECIFIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL FOR INSTANT DECISION AND ACTION BASED ON BOTH EXCEPTION AND OBSERVATION. But management information is, however, not only specific to each level or section of responsibility as delegated; it is pertinent, too, to the co-ordinated operation of the management process as a whole within a given organisation, especially in regard to the elements of planning, control, and communication.

More and more managements are today realising that scientific and correct policy making decisions determine not only the extent of the success of their undertakings, but also their ability to stay in business. And as scientific and correct management policy decisions are synonymous with an efficient and effective system of internal control, managements pay more attention to the means of achieving and maintaining this tool of modern management.

Petrof J V, Carusone P S and Mc David J E (1972) op cit, page 7, depict the relationship between decision accuracy and information as follows:



In the wake of the management control information explosion of the sixties came an unprecedented increase in the demand for the collection, collation and presentation of pertinent data as the basis for scientific management policy making decisions.

Mc Gregor D sees this as follows: Since the halfway point of the twentieth century, we have seen an explosion of knowledge and technology that has changed life for all of us. Increasingly significant to men entrusted with the stewardship of organisations is the rapid growth of knowledge in the social sciences, particularly those concerned with man's behaviour in his organisational environment. Emerging as a central concern in the sixties is the utilisation of this knowledge, the application of behavioural science research to the practice of management and the direction of organisations.

cf Mc Gregor D - The professional manager - Mc Graw-Hill company New York 1967.

Forcibly, indeed, came the awakening that accounting control, with its inherent time lag in presentation, was now not only wholly inadequate, but completely misleading to a dynamic management which endeavoured to prognose the future based on historical recording. Further it became clear that the administrative control, as defined, known and accepted in the profession and elsewhere, was lacking in the very basic qualities that scientific management policy formation was dependent on.

Drucker P F (1974) op cit, page 16 states that the reasons for this was surely that managers themselves suddenly realised that management is challenge and work rather than a panacea, and the management techniques, no matter how sophisticated, are not magic spells. Above all, managers everywhere realised that the foundation on which the management boom had been based, i.e., the knowledge acquired in the long years of obscurity before World War II, had been outpaced by new developments. IT WAS BEGINNING TO BE SEEN THAT NEW KNOWLEDGE, NEW BASIC APPROACHES, AND NEW UNDERSTANDING WERE NEEDED. AND THOSE THE MANAGEMENT BOOM COULD NOT SUPPLY.

Rademan C F O submits that with the advent of the 70's and automation, the vital role of internal control has now assumed such vast proportions that it should be viewed in two sections viz:-

1 INTERNAL CONTROL - NEAR AUTOMATIC AND BASIC

As previously propounded for the profession in the 70's - the basis of the new-look audit approach.

2 INTERNAL CONTROL - DYNAMIC MANAGEMENT

As propounded for the scientific day to day conducting of the undertaking by the senior and junior management through their dynamic policy formulation and decision making based on prognostic costfinding management reporting of current events. To be virtually -live- supervision at the source through the medium of a twin or dual trail which must merge at some point, constantly being subjected to positive near automatic and basic supervision, to comply with, and facilitate, the audit trail requirements for surveillance.

As section 1 - internal control - near automatic and basic - being before the fact and a prerequisite for section 11, is THE VERY BASIS OF ANY FORM OF CONTROL we cannot take its existence, efficacy and continued watchfulness for granted as it is the updated version, referred to earlier, -duly dressed- in the -fashion- of today, with the twin or dual streams of control that permeate the spectrum.

But control, with particular emphasis on today's cost structure, IS AT A COST and before we face the accusation of being theoretical and ignoring exorbitant overhead costs, let us, here and now, categorically state that the management control advocated herein is at all times subject to the doctrine of common sense.

To illustrate this one can best quote the words so well known to the student of auditing -Is it an economical proposition to hire a policeman at R50 per week to safeguard and protect goods worth R10?-

Further, the pundits tell us that expenditure on advertising, like armaments, is determined, not internally, but by that of the -opposition-. From this can it not be inferred that the cost of any system of control is determined by the cost of disaster? In other words every man is either his own insurer or he pays the premium to ensure success.

The answer to this can best be left to the businessman and posterity. BUT everything is at a cost. Should an undertaking choose to be its own insurer, then, if in nothing else, it must pay -the price- in audit fees.

Sufficient time has now been devoted to the scope, origin and definition, in general, of control, and so let us now devote the rest of this chapter to some of the aspects that form the basis of the scientific management control as contemporaneously advocated and applied.

Today scientific management is accepted as the art of doing the right thing at the right time and in the right place THROUGH EFFECTIVE COMMUNICATION AND CONTROL. de Villiers W J presents the six aspects of management as parts of a unified whole; all contained within a framework of communication. The logical procedure is to start with -investigating- and -forecasting- and to

...../follow

follow through each one to -controlling-. At the same time, a distinction must be made between the nature of the various aspects in that:-

Investigating and forecasting,	)	constitute the mechanics of
	)	
planning, and	)	management.
	)	
organising	)	

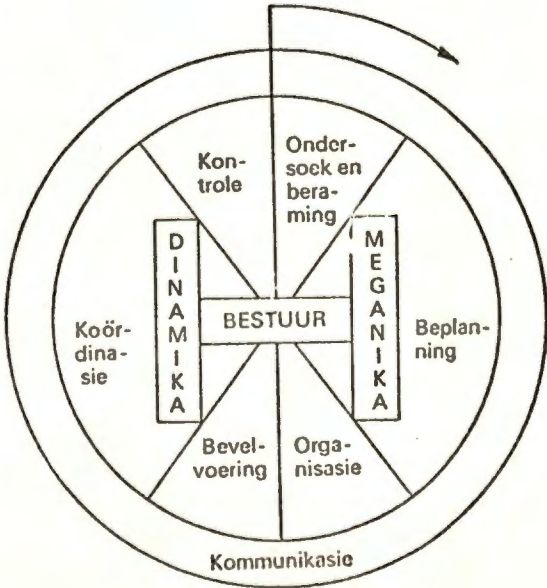
Commanding		constitute the dynamics of
co-ordinating, and		management.
controlling		

de Villiers W J dr - Principles of decentralised management - Published by the Federale Mynbou - General Mining Group - Johannesburg 1972.

This distinction rests on the fact that the mechanics of management deal with the pre-conditions which must be established before the application of human, capital, and material resources can be effective, whereas the dynamics of management are concerned with the people doing the work. These aspects of management can be regarded as the modus operandi of managing. Managerial ability, however, involves more than the successful application of these aspects of management. Diagrammatically de Villiers W J visualises the aspects of management thus:-

cf Principles of decentralised management - op cit.

THE ASPECTS OF MANAGEMENT



de Villiers W J accepts that control involves not only

- the predetermination of the desired results, and
- action to be taken to achieve conformity of the actual with planned results, but also
- effort directed towards improving the standards of planned results.

Further reflection on the above highlights the fact that the important elements in the control of an industrial enterprise are the individuals. This leads to the concept of decentralised control:

Author's note: In this context decentralised control can be taken to refer either to geographic dispersion or to -in-house- spread within an organisation.

- a Within the framework of plans and their extension to quantitative statements of production and consumption per time period, predetermined standards of performance can be established for all responsible officials at every level of the scalar chain.
- b Measuring systems for comparing actual with planned results can be established at each level.
- c Action to be taken in case of variances can be determined.
- d Control must be exercised at each level by the person in charge: this ensures quick response with a minimum of delay.
- e Control at each higher level is achieved by applying the principle of exception. The next higher official should receive only condensed, summarised and comparative reports dealing with the aspects that concern the lower level of activity. He should have all the exceptions to the past averages or to the standards pointed out - thus giving him in a few minutes a full view of the progress or otherwise that is being made. His control action is then confined to the exceptions.

In concluding, de Villiers W J states that these principles can be carried upwards through the scalar chain up to the centralised authority - the Board of Directors - where control of output, expense and financial control are achieved by applying the principle of exception of actual performance against planned results.

Careful and close scrutiny of the diagram of the six aspects of management as set out by

de Villiers W J reveals a positive correlation of the control aspect of management as propounded

...../herein,

herein, viz:-

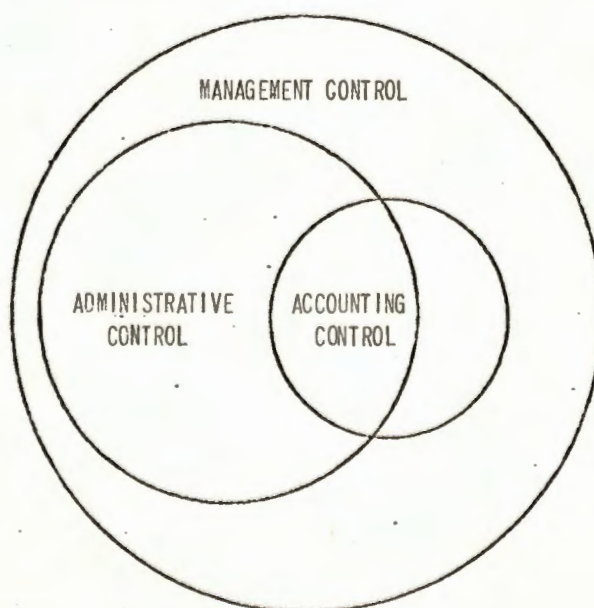
- 1 That all control measures are absorbed into, and become, an integral part of the homogeneous whole of the activities of the undertaking:
- 2 That control flows into a heterogeneous pattern of differentiation of set functions.
Chronologically viewed
 - a the origin of the managerial or entrepreneurial team;
 - b the postulation of an infrastructure to achieve the goal, whether it be premises, buildings, re-inforcing ancillaries etc, and
 - c the postulation of potential to provide policy for activities as well as for control measures.

All these culminate in the accounting to management, through accountability. The aspect of control that de Villiers W J accepts tacitly, but which is treated in detail in this thesis, is that the MEANS THAT FORM THE SPECIFIC PROVISION OF AN IDENTIFIABLE TRAIL FOR INSTANT DECISION AND ACTION, BASED ON BOTH EXCEPTION AND OBSERVATION, ARE THE FOUNDATION OF AN EFFECTIVE EXPRESSWAY OF MANAGEMENT REPORTING.

Accepting the diagram of the six aspects of management as part of the spectrum, all contained within a framework of communication, there is ample justification for the hypothesis that the scientific control contemplated by de Villiers W J and that submitted by Rademan C F O were both developed from the same basic imminence, i e, compelling needs.

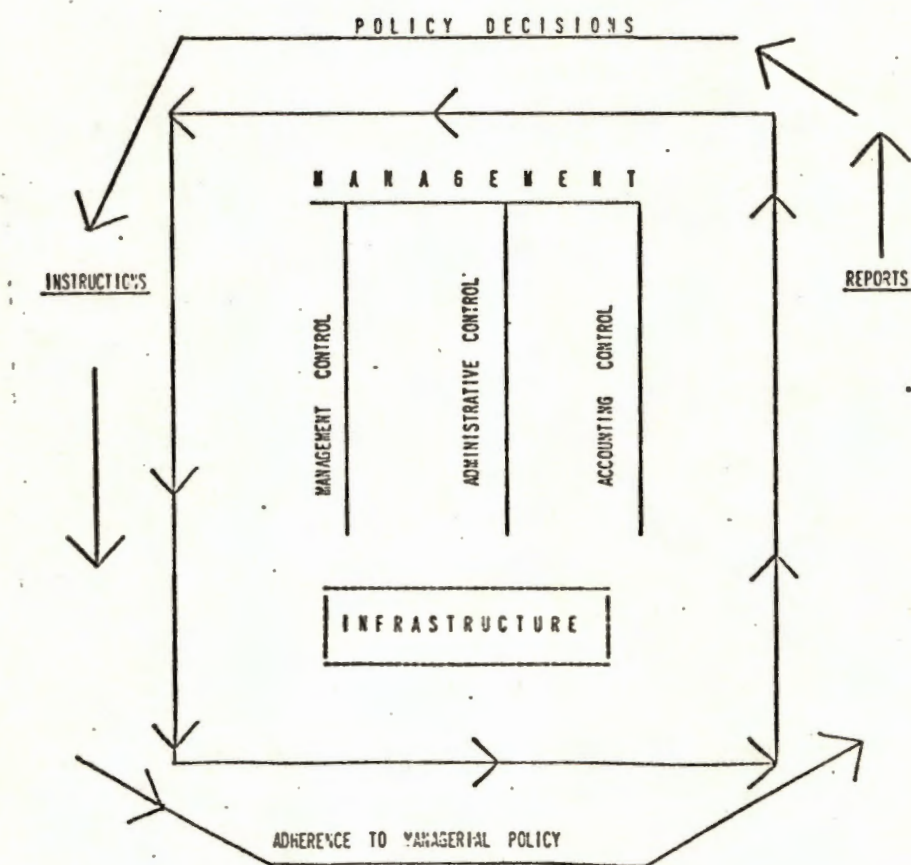
The way this has evolved may be shown diagrammatically as follows:-

- 1 The present philosophy for the seventies:



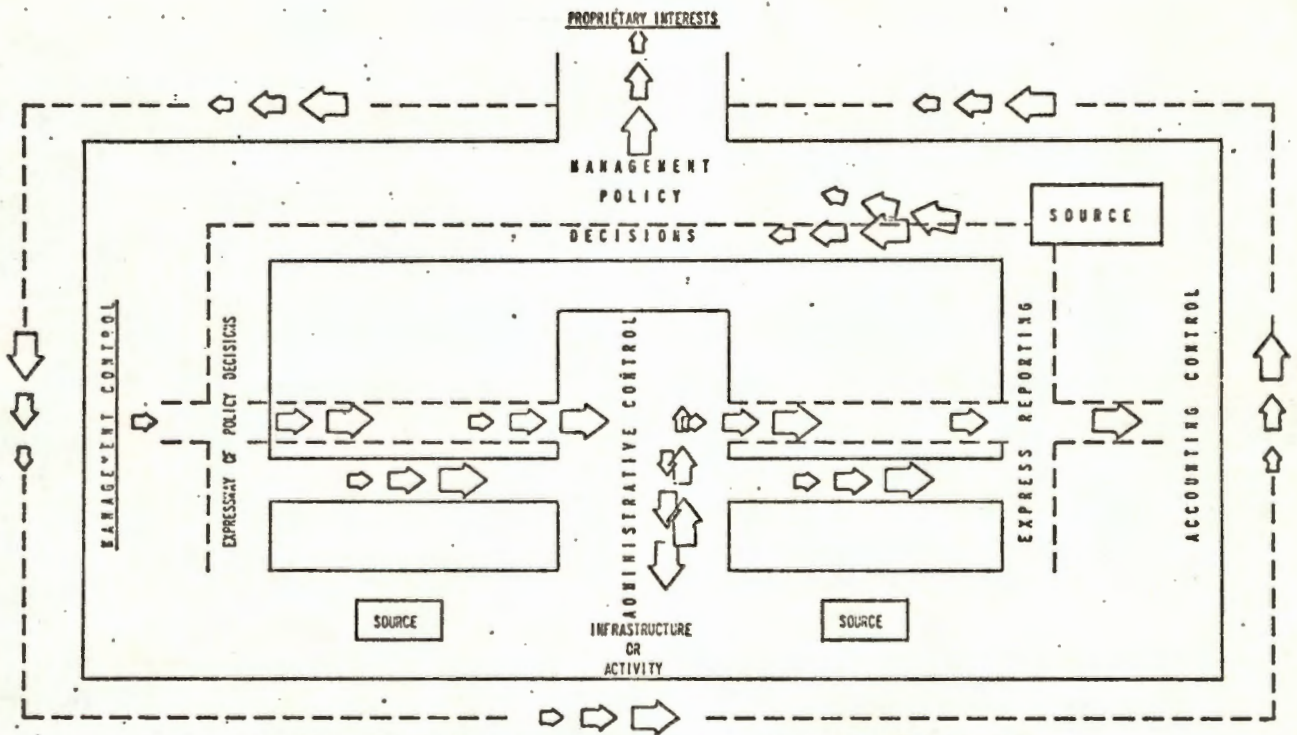
But also

2 Through the conventinal viz:-



And an obsolete point of view

3 To the assymetrical viz:-



SHIFT POLICY DECISIONS BASED ON EXPRESS REPORTING - THE INLET TO THE HIGHWAY OF SCIENTIFIC MANAGEMENT CONTROL

In the Handbook for Managers there is consensus of opinion by the leading protagonists of modern scientific management as to the term management control.

They see it as:-

-Management control is the process by which we regulate action to achieve business objectives.

More specifically, control refers to the action you must take as a manager, in order to get back on course when events haven't turned out quite as you had planned!

Management control matters to you, because your job is to achieve your objectives.

Management control helps you to achieve your objectives. But briefly, management control is knowing where you are going, knowing when you want to be there, knowing how to get there, knowing where you are now, changing course if you are going adrift, and moving faster or slower if your timing has slipped. It's like sailing a boat, or driving a car-.

cf Handbook for managers - Kluwer-Harrap Handbooks - London 1972. Section 2 9 - 3
Management control - Pages 2 9 - 301 2

Of management control systems the Handbook for Managers states that:

-In considering the range of management techniques whose avowed objective is to control some aspects of industrial or commercial performance, we must recognize that we are concerned with two types of systems. Firstly there is the system over which it is desired to exercise control: this is called the controlled system, examples of which are quality (quality control), budgets (budgetary control), damage and accidents (damage control), and stocks or inventories (inventory control). In order to achieve control a separate system is created to find out what is happening, measure it, compare it with desired values, plan for any necessary change to bring actual and desired values closer and finally take action.-

cf Handbook for managers op cit, Page 2 9 - 201

The latter is called the control system, examples of which are given in brackets above, against the relevant controlled system. Each item of work that is contained in a system is called an element. In the basic form of a controlled system there is one element, the process, and two signals which transfer information or resources into or out of the system (the input and the output respectively). A control system in its basic form has five elements, thus:-

- 1 The detection element - this finds out what is happening in the process or output.
- 2 The evaluation element - this evaluates or measures present values in the process or the output.
- 3 The specification element - this specifies the desired values against which to compare the actuals.
- 4 The motorisation element - this prepares the ground for action to bring actual and desired values closer together.
- 5 The correction element - this takes action by exerting an influence usually on the input, but possibly on the process along the lines worked out by the motorization element.

These control/controlled systems can be permanent with desired values as constants (e g, a budgeted fixed cost), with measurement and review at fixed frequencies (e g, monthly), or they can be designed and operated as one-off ventures, e g, to control the programme for a VIP visit. Again, they can be formally structured, with a written procedure and with responsibilities shared by many people, or they can be informally designed with a single person taking action when he seems fitted to keep some variably roughly in the right place. It is indeed gratifying to find that not only do the pundits accept the term management control but further, by implication, they acknowledge with their words -with two types of systems- the existence of the twin or dual streams of the static and dynamic control advocated herein as the means that culminate in swift policy decisions based on express reporting - the inlet to the highway of scientific management control.

Now, secure with the knowledge that we are not alone in our quest for the acceptance, extension,

...../and

and greater application of scientific management control, we can proceed and review the exigencies for the need of control as seen in the light of costfinding.

C O S T F I N D I N G

BORN OF THE EXIGENCY OF THE NEED FOR CONTROL

(pages 2 17 - 2 41)

CHAPTER II

INDEX

- 1 Costfinding - the corollary to the theory of management control
- 2 The operation of the three economic laws of increasing, constant, and diminishing returns
- 3 The object of the exercise of control is to cover the whole field of the undertakings activities
- 3 The feedback mechanism
- 4 Supervision at the source of all transactions
- 5 The application of the basic objectives of internal control
- 6 The objectives of control
- 7 Bridging the communication gap
- 8 The theory of management information
- 9 Shifting the emphasis from legalistic rules to empirical hypotheses
- 10 The need for prompt and accurate reporting
- 11 Costfinding
 - 11 1 Definition
 - 11 2 The concept of costfinding as applied in the Dunswart Iron and Steel Works Group of Companies
 - 11 3 The need for change
 - 11 4 The ultimate medium of control
 - 11 5 Originally management accounting and control - now Costfinding.

2 COSTFINDING - BORN OF THE EXIGENCY OF THE NEED FOR CONTROL

Costfinding.- the corollary to the theory of management control

As already submitted in this thesis conventional cost accounting (including the new aspects of management accounting) can no longer cope with the demands for the multiplicity of the management control data of the various echelons of contemporary management WITH SPECIAL REFERENCE TO THE SHOPFLOOR.

From these factors was the concept of costfinding conceived.

Costfinding is a term updated and adapted by Rademan C F O op cit, from the general definition of RYALL R J H Dictionary of costing - Sir Isaac Pitman and Sons Limited - London 1946 to represent and be synonymous with all the modern techniques of management control that allows live supervision at the source with significant deviations from the norm highlighted immediately for corrective action by the appropriate level of management. The concept of costfinding is founded on the doctrine that SWIFT POLICY DECISIONS BASED ON EXPRESS REPORTING IS THE INLET TO THE HIGHWAY OF SCIENTIFIC MANAGEMENT CONTROL.

The term costfinding is also used by Kimbell D S and Kimball D S Junior in their chapter 18 where they discuss principles of costfinding. These pioneers state that with a good system the manager can keep himself informed regarding shop operations AS THEY PROGRESS and can often avert losses and difficulties, instead of waiting until the work is finished when remedy will come too late.

This work further states on page 329 that the relation between cost finding and accounting should be carefully noted. Costfinding can be and frequently is conducted without reference to the accounting system. In fact the FIRST MODERN COST SYSTEMS GREW UP WITH LITTLE RELATION TO THE GENERAL ACCOUNTS.

Up to this point these authorities of a generation ago had excellent ideas. But here- after they taper off into, and discuss, the cost accounting principles of their day apparently drawn mostly from Ryall R J H (1946) op cit, These authorities close off this section by suggesting that a consultant should be called in in case of difficulties.

cf Kimball D S and Kimball D S Junior - Principles of industrial organisation - McGraw-Hill inc. New York 1947.

1. General

Today in every phase of industry, more so than in commerce, the vulnerability of the

...../profit

profit structure of an undertaking to the operation of the three economic laws of increasing, constant, and diminishing returns increases practically in a geometric progression as the lines of demarcation between them narrow with the increase in size and geographic dispersion of the large scale production unit. And in order to endeavour optimum returns in an uncertain world of inflation, rising costs and acute skilled and unskilled manpower shortages, management is now, more than ever before, dependent on effective systems, procedures and controls upon which to base their policy formulation and decision making executive function.

Already in 1961 Curley J R acknowledged that, faced with the never-ending pattern of change in current operations and long-range plans, managements must seek a better answer to the complex problem of control. Curley further accepted that whatever the correct definition of control may be, it must be one capable of being practised as a dynamic rather than a static concept. A dynamic concept where the plans - prognoses - made in the quiet undisturbed offices of management, could to a reasonable extent, direct the day to day operations in the Plant. Herein then in 1951 lay the challenge of modern executive leadership.

cf Curley J R - an article -A tool for management control- Harvard Business Review
Volume XXIX No, 2 March, 1951 Pages 45 - 49.

Today, keenly aware of this challenge, managements are constantly devising methods to make itself and its key subordinates more efficient. Many of the control methods currently practised are very informal and depend primarily on the unique backgrounds and abilities of key executives who are justifiably proud of their good average in making decisions, even though in many instances these decisions are based on scanty factual data. There are, on the other hand, an increasing number of executives who are finding that personal qualities of leadership and business know-how are far from the whole answer especially when they are dependent on a time and accuracy-intensive

...../accounting

accounting system for the information on which to base their policy formulation and decision making function.

2. Control

As previously stated all forms of control have only one goal - the protection and safeguarding of assets and income and the achievement of optimum returns at all times - and as these are all management controls, management must assume full responsibility for them. But management, owing to the multiplicity of measures entailed, cannot exercise personal supervision over all the levels and branches of the undertaking's activities, and it must DELEGATE authority and responsibility in a descending order of seniority.

Koontz J and O'Donnell C clarifies the delegation of responsibility clearly by stating that responsibility cannot be delegated. While a manager may delegate to a subordinate AUTHORITY to accomplish a service and the subordinate in turn delegate a portion of the authority received, none of these superiors delegates any of his responsibility. Responsibility, being an obligation to perform, is owed to one's superior, and no subordinate reduces his responsibility by assigning the duty of another. Authority may be DELEGATED, but the responsibility is CREATED by the subordinates acceptance of his assignment.

cf Principles of management - McGraw-Hill inc, New York 1955.

The object of the exercise of this control is to cover the whole field of activities i e, to supervise that assets are used in pursuance of the objectives of the undertaking, are accounted for accordingly and that income is earned with the maximum economy in the application of the assets.

Reeser C (1973) op cit, page 351 states that control is found to be a descriptive task in all organised groupings of operational activities. Thus, in addition to assuring the effectiveness of the managerial functions, control also implies validation of the ways that operations are performed. Reeser further states that vital to the controlling function is the feedback process. After goals are formed for business operations and resources committed to achieving them, it is essential to have EFFECTIVE

...../feedback

FEEDBACK OF RESULTS.

It thus becomes obvious that a system of internal control, scientifically and consistently applied throughout, is the most important aid at the disposal of the management for the fulfilment of its control function over both policy making and the ascertainment of the extent to which its subordinates have successfully carried out instructions, and that maximum returns through optimum utilisation of productive facilities have been achieved.

To attain this goal management has at its disposal a whole series of techniques and aids, embracing all activities from the production stage to the ultimate sale. These techniques and aids include the setting of specific goals, the planning and organisation of policy and procedures to attain these goals, the creation of means to put such policy and procedures into effect, the measurement of the results against specific standards, and the determination of the degree of success of the whole range of activities.

Koontz H states that disillusioned by the subjectivity of trials and work qualities, intelligent practitioners have understandably looked at what the purpose of organised activity is and the basic task of a manager in acting as a CATALYTIC force in enterprise operation. It therefore became natural and logical to appraise managers against the STANDARD OF THEIR MOST IMPORTANT CRITERIA OF PERFORMANCE - THE SETTING AND ACHIEVEMENT OF OBJECTIVES.

cf Koontz H - Appraising managers as managers - McGraw-Hill co, New York 1971.

In the implementation of such a system of control the emphasis necessarily falls on SUPERVISION, and the basis of effective supervision is that it be carried out at the SOURCE. Rademan C F O states that the success or failure of an undertaking will be determined in the future, not only by the degree of accuracy, efficacy and effectiveness of management policy decisions, but also by the rapidity of the reporting on which management base its policy decisions.

cf Internal control: A study of its historical developments, contemporary concepts and imminent needs to suffice modern demands 9 ibid - page ii.

Following this hypothesis to its logical conclusion it becomes increasingly clear that swift policy decisions based on express reporting - the inlet to the highway of scientific management control - is the key to success. To achieve this success the basic objectives of internal control must be applied and promoted so as to ensure:-

- 2 1 That all control measures are absorbed into, and become, an integral part of the homogeneous whole of the activities of the undertaking;
- 2 2 That control flows into a heterogeneous pattern of differentiation of set functions.

Chronologically viewed,

- a the origin of the managerial or entrepreneurial team;
- b the postulation of an infrastructure to achieve the goal, whether it be premises, buildings, re-inforcing ancillaries etc, and
- c the postulation of potential to provide policy for activities as well as for control measures.

All culminating in the accounting to management, through accountability, by means of an effective expressway of management reporting so as to ensure the SPECIFIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL FOR INSTANT DECISION AND ACTION BASED ON BOTH EXCEPTION AND OBSERVATION.

But, management information is, however, not only specific to each level or action of responsibility as delegated; it is pertinent, too, to the co-ordinated operation of the management process as a whole within a given organisation, especially with regard to the elements of planning, control, and communication.

- 2 3 The objectives of control

As pointed out in our introduction, assets derive income, actively and passively, and therefore the object of all systems of internal control is to supervise at the

source that assets are utilised to ensure maximum efficiency and to safeguard income. The means to achieve this goal is an enlightened, dynamic and cost conscience MANAGEMENT TEAM to concentrate on sound company policy formulation, to lay emphasis on supervision at the source, to delegate authority on a downward scale and to fix responsibilities at the source. In short, it can be submitted that an undertaking is as sound and progressive as its management control allows its management to be. But to this must be added as well, that not only is it the responsibility of the management team to ensure that the necessary systems are installed to meet these imminent needs, BUT ALSO TO FULLY UTILISE AND ACT ON THE INFORMATION REPORTED.

Petrof J V, Carusone P S and McDavid J E (1972) op cit, page 7 agree that it is also a prerequisite for management to be able to interpret its information correctly and thus to use it constructively. In their work these authors state that managers often reach the wrong conclusions, not because they had the wrong information but because they were not able to interpret it correctly. It is for this reason that information must be subjected to several time tested managerial techniques.

While growth of an organisation in, and of, itself increases the problem of management control, the geographic dispersion multiply these factors many times.

Drucker P F (1974) op cit, page 681 acknowledges the impact of growth and geographic dispersion on an undertaking's management control system when he states that there is a point of complexity beyond which a business is no longer manageable. When top management has to depend totally on abstractions such as formal reports, figures and quantitative data, then a business has become too complex to be manageable. A business is manageable only if top management is capable of testing against concrete reality the measurements and information that it receives, i e, its abstract figures, data, and reports. Yet this eminent author does at this point NOT analyse the reasons for the continued growth and success of the greatest organisation in the world - General Motors.

Operating authority moves with the dispersion, and unless effective methods of co-ordination and control are established, there will inevitably be a strong tendency for different operating units to develop along independent lines, and top management will have no assurance that its plans,

...../policies

policies and procedures are being carried out properly. It is here that an analysis must be made of a proper system of internal control. The organisation should be so established that no individual, and no one unit, is in complete control of all phases of a transaction, nor may the individual or unit carry out an assigned responsibility in the business without:-

- 2 3 1 Co-ordinating it with the rest of the business
 - 2 3 2 Following prescribed policies and procedures
 - 2 3 3 Being responsible for results according to assigned authority
 - 2 3 4 Being subject to impartial examination, questions and appraisal by representatives of management.
- 2 4 Bridging the communication gap

One of the foremost industrial problems of today is the bridging of the gap between top management and line operation in such a manner that free EFFECTIVE communication may be maintained from top management to the point of action and conversely from the point of action back up the line to top management i e, THE FEEDBACK MECHANISM.

The downward flow of communication is relatively free. Policy is formulated and set in motion by each successive layer of supervision as a matter of normal routine. The reverse flow is not true. Stumbling block after stumbling block is encountered so that finally the normal flow becomes a mere trickle when it reaches the top.

Reverse flow communications have been smothered, or syphoned off, by various strata of supervision for different reasons. So much so that in many instances management is not informed of vital incidents etc, i e, it becomes isolated. This degree of isolation is usually directly proportionate to the growth of the business and the geographical dispersion of its activities as each succeeding layer of supervision is a potential impediment to a free flow of communication. To counter this, reverse flow reporting systems - feedback

of information - must be strengthened and the -snowball- or vicious circle of increasing costs has started. THE TRICKLE THAT CAN EVENTUALLY DROWN THE PROFIT POTENTIAL.

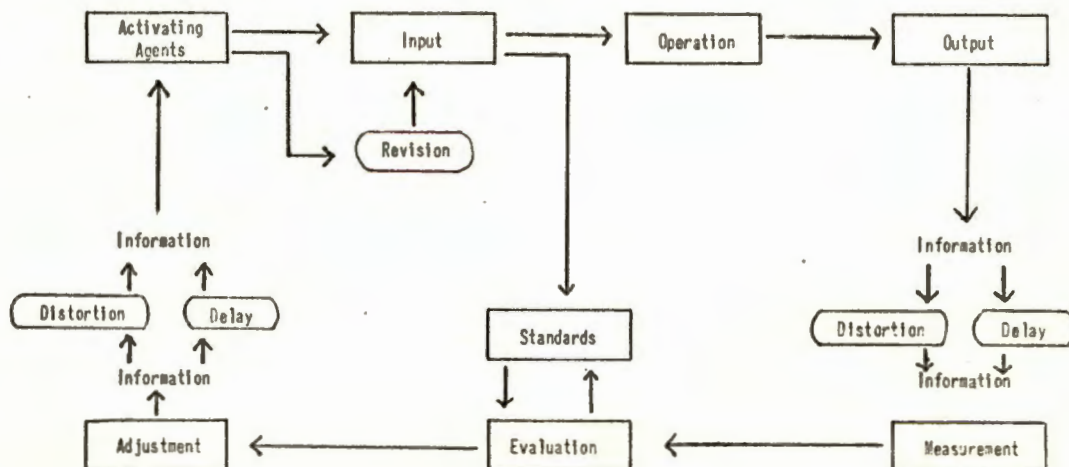
McGregor D page 116 defines the information feedback control loop as a process by which information about past or present performance is used to influence future performance.

cf McGregor D - The professional manager - McGraw-Hill co, New York 1967.

2 5 The theory of management information

It is in this area of the utilisation and disposition of resources, and the assessment of the outcome from their application, that the judgement/decision aspect of the management control process comes most into play.

To accomplish this task soundly, and reliably, management needs data - facts and figures, economic, physical and financial, to provide a base from which to formulate its plans and against which to exercise control of performance and progress. Such data is the management information that enables management to function scientifically in the sequential action of collating the relevant facts, considering and judging them, determining the conclusion to which that consideration leads, provisionally testing the conclusion, and finally issuing a policy decision in the light of the test. THIS POLICY DECISION BECOMES THE PLAN, and when the performance data reveals deviation from the prognosis, then the policy decision is reviewed in the light of the new facts and revised policy decisions can be scientifically made. The feedback cycle is thus complete.



Brech E F L (1966) states that as data is of the essence of the action and reaction of the feedback cycle, management information is commonly spoken of as the -tools- of the management, yet these information -tools- are needed differently in different parts or levels of an organisation, and data procedures have to be appropriately worked out to meet specific requirements. Whether this is considered in theory or in terms of practice, management information is an essential feature of the management process absorbed primarily in the elements of planning and control, with secondary contribution in co-ordination. In consequence, the procedures designed to give effect to the information, is the means by which the management exercises their judgement in forming their decisions: the scope and extent of these is determined by the responsibility (defined) delegated, or allocated, to their role, and are thus reflected by the divisions and levels of the organisation structure.

cf Brech E F L - The principles and practices of management. Longmans, Green and Co. London (1966).

Of managements' decisions some, or many will be routine, pertinent to the daily or weekly activities under their jurisdiction; if errors of judgement occur here these errors can normally be corrected with little, if any, consequence. Other decisions will refer to major action, and will be ad hoc to situations of importance where errors of judgement could only be capable of correction, either at considerable cost or not at all. Sound principle therefore requires that DATA AVAILABILITY SHOULD BE APPROPRIATE TO THE SIGNIFICANCE OF THE DECISIONS.

Reeser C (1973) op cit, page 88 divides decision factors into two categories. Tangible factors which are those that can be expressed numerically, such as hours of labour, units of production, and dollars of profit. Quantitative techniques arrange tangible factors into logical relationships and derive numerical solutions. Intangible factors which bear heavily on many decisions, but they cannot be expressed numerically. Reputation,

...../community

community relations, and employee morale are examples of such factors.

Management information is, however, not only specific to each level or section of responsibility as delegated; it is pertinent, too, to the co-ordinated operation of the management process as a whole within a given organisation, especially in regard to the elements of planning and control.

2 6 Shifting the emphasis from legalistic rules to empirical hypothesis

The process of transition from conventional cost accounting - historical accounting control - shifts the emphasis from rules to hypothesis, and to achieve scientific and successful management control ACCOUNTANTS MUST LEARN TO THINK IN TERMS OF EMPIRICAL HYPOTHESES RATHER THAN LEGALISTIC RULES i e, STANDARDISED OR NORMALISED RULES.

To be able to do this successfully it necessitates at the outset full recognition of the indisputable fact that ALL CONTROLS - REGARDLESS OF HOW TRIVIAL - ARE MANAGEMENT controls. Further that it is imperative for such controls to be fully utilised and consistently applied by management and it's deputies.

Rademan C F O op cit, defines management control, in it's broad sense, as the combination of procedures, methods, organisation or function and other measures by which management:-

2 6 1 Keep itself informed of the state of the business

2 6 2 Co-ordinates functions

2 6 3 Maintains efficient performance

2 6 4 Ascertains whether the business is being operated in conformance with established policies

2 6.5 Assures itself that objectives are being met.

Rademan C F O states that management control embraces five elements. If any one of these is lacking, control is not complete, AND INCOMPLETE CONTROL IS DEFECTIVE

...../control

CONTROL. These forms of control may be described differently, or be located in different places, but they constitute the basic foundation upon which good management rests; and can be tabulated as follows:-

Five elements of management control

- i. OBJECTIVES - ends to be accomplished
- ii PLANS, POLICIES AND PROCEDURES - an outline of how, when, and by whom, the objectives are to be attained
- iii TECHNIQUES - premises, planning and budgets i e, assumptions as to future facts and conditions interpreted in the light of current actualities
- iv STANDARDS - yardsticks for measuring the results achieved in carrying out the plans, policies and procedures. i e, comparison is control!
- v APPRAISAL AND EVALUATION OF RESULTS - how well the work is done.

Other forms of control are company policies, sound organisation, accounting, cost accounting, planning, forecasting, budgeting, manuals, reports, methods engineering, job analysis, work simplification, work measurement, standards, incentive plans, suggestion plans, etc.

2 7 The need for prompt and accurate reporting

Research into exigencies proves that probably the greatest shortcoming in industry today is the sub-standard management reporting systems in use. Management, with the unprecedented growth and geographic dispersion of the large scale production unit, assume an ever-increasing degree of responsibility for the OPTIMUM USE AND SAFEGUARDING OF ASSETS AND INCOME. With this increase of responsibility must, of necessity, come an increase in the nature, range, depth and type of controls at its disposal. Management reporting systems must now provide the basis for prognosis of anticipated conditions more than of past and present situations. These latter are, in fact, pertinent only insofar as they foreshadow the expectation of the future, and allow policy decisions with alternative choices of future action.

Petrof J V, Carusone P S and McDavid J E (1972) op cit, page 7 and 352 are one of the few authorities that specifically accept the principle of prognosis advocated in this thesis as one of the cornerstones of costfinding.

These authorities state that by combining skill in data gathering with certain analytical procedures, a businessman can sharpen his diagnostic and prognostic abilities. These familiar medical terms ARE EQUALLY APPLICABLE TO THE PRACTICE OF MANAGEMENT. -Diagnosis- refers to the art of recognising a malfunction from its symptoms. Prognosis goes a step beyond and foretells the outcome of the malfunction. Therefore, through a knowledge of its symptoms the professional manager is able to identify a problem and to predict its course and outcome.

Hence is born costfinding the management control of the successful industrial giants of tomorrow.

3 Costfinding

3.1 Definition

Costfinding in general may be defined as the management aid or technique that endeavours to equate historical - time and accuracy-intensive - data with the present value thereof to management. It's main object is to assist management to shoulder its responsibility for the continued prosperity, growth, survival and financial performance of the undertaking; as such costfinding encompasses the same company-wide sphere covered by management authority and responsibility. Costfinding is therefore synonymous with control - the management control propounded in this thesis. The internal control that supersedes, consolidates and extends the relatively static accounting and administrative control of the past to the present dynamic control which covers, penetrates and permeates the entire spectrum of the undertaking's activities.

The culmination of scientific costfinding is the reporting and evaluating function which flows from an integrated mechanised accounting system based on accountability that is functional, with purpose or activity, as the hub of the theme. An

...../unconventional

unconventional theme with the prerequisite that right from the inception there is an accounting flow for expenditure which conforms to the departmental function and not to the nature of the expenditure. There is therefore a designated departmental official responsible for every item of cost making up a given function and there is no expenditure which is not occasioned by a specific and identifiable purpose or function. The identification of the tributary purpose is therefore the determining factor and this is based on the managerial tree of responsibility. Thus even though similar types of expenditure may be incurred in different functions there is effective control of each function WHERE IT IS INCURRED. The cardinal rule of this system is that there is an official responsible for every item of expenditure incurred by his function. There is therefore basic supervision concentrated at the source of all activities - AUTOMATIC SOURCE CONTROL! This principle follows on somewhat similar lines to the audit approach of test checking which cuts diagonally across the sample being tested.

A further great advantage of this method of accounting is that it facilitates and expedites departmental or cost centre budgeting and reporting of variances from the norm.

One of the most important requisites of efficient management today is that control reports must be issued, sufficiently quickly and frequently, to enable corrective action to be taken before it is too late. Therefore, the general rule is that SPEED OF PRESENTATION IS FAR MORE IMPORTANT THAN PRECISE ACCURACY OF DETAIL.

Dew R B and Gee K P (1973) page 46 states that a major reason for non-use of statistics given by line managers was that information was received so long after the period to which it related that it was no longer a guide to effective action. 150 out of 152 managers said the same of their cost information.

cf Dew R B and Gee K P - Management control and information - The McMillan Press Ltd. London 1973.

From this rule has emerged the doctrine of COST FINDING, based on the memorandum compilation of management information which incorporates all the aspects of supervision at the source. This in turn promotes the most economic use of assets at any GIVEN VOLUME OF PRODUCTION.

All the reporting is in the form of comparative daily, weekly, monthly and year to date statistics of deviations from the norm or planned results. Ultimately, as the -eyes and ears- of management, these statistical accountability reports of untoward factors, together with reasons therefore, will replace the remaining vestiges of internal audit that still remain in industry.

These reports, returns, and statements, do, in most instances, not endeavour to evaluate variances in terms of money, but consist of numerical data such as output, yields, raw material consumption, manhours, idle time, breakdowns, overtime premium, scrap and rejects, machine hours, power consumption, supervision, labour complements, overheads and the host of other management information that enable IMMEDIATE POLICY FORMULATION AND DECISIONS TO ENSURE REMEDIAL ACTION WHERE NECESSARY.

Reeser C (1973) op cit, page 352 states of the standards of measurement that they have one requirement in common: as far as possible, they should be expressed in numerical terms. This requirement is critical because quantitative standards minimise the necessity for human effort and afford comparability.

Therefore, cost finding in its true sense, as outlined above, becomes -CO-ORDINATED CONTROL-, and can rightfully stake its claim for recognition as an integral part of the fully integrated systems of management planning and control of the future.

But it must however be stressed that cost finding, in no way, strives to supersede cost accountancy as a management control. Cost finding functions by endeavouring to ascertain trends, establish current variances from the norm, and interpret such deviations in numerical, arithmetical, and other forms of measurement as a forerunner, or basis, for management corrective

...../action

action.

Reeser C (1973) op cit, page 88 states that over the past ten to twenty years one of the two influences on management has come from the quantitative techniques for assisting in decision making. Decision factors are tangible or intangible. Tangible factors are those which can be expressed numerically, such as hours of labour, units of production and dollars of profit. Quantitative techniques arrange tangible factors into logical relationships and derive numerical solutions.

But as costfinding techniques, based on reporting only the exception to management for immediate corrective action, advance, are accepted and become perfected, it could even oust cost accounting from the industrial scene of tomorrow.

3 2 The concept of costfinding as applied in the Dunswart Iron and Steel Works Group of Companies

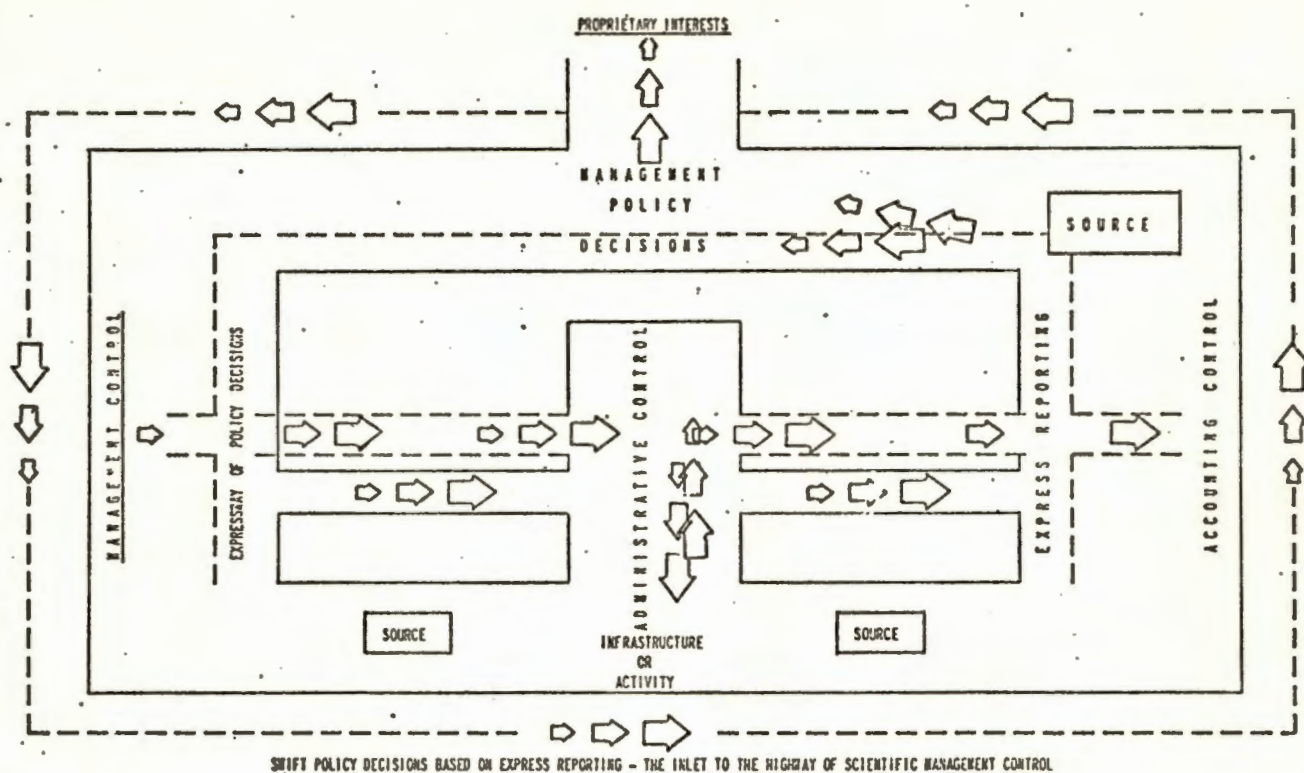
As analysis of the concept of costfinding as applied in this Group reveals that it covers not one but all the aspects of the management information, reporting, control and recording system.

It replaced, superseded and incorporated into one composite whole all the functions and aspects of the former accounting, cost accounting and internal control departments.

Costfinding comprises three aspects or functions viz:

- 3 2 1 The evaluating and reporting function
- 3 2 2 The control function
- 3 2 3 The recording function

These three components or functions are so completely inter-dependent and inextricably interwoven that they form one spectrum. A spectrum from which optimum results can only be derived while the three functions work in harmony because should efficiency deteriorate in any one section the whole will suffer. Diagrammatically depicted the principles and objectives of costfinding will be seen to be:



The foregoing is but a brief definition, explanation and synopsis of costfinding and the components, principles and objectives that all culminate in swift policy decisions based on express reporting - the inlet to the highway of scientific management control. A more detailed examination of the aspects and applications of this management information, reporting, control and recording system will be made in Section II when empirical aspects and phases of management control through costfinding, structured with actual examples, as installed at Dunswart Iron and Steel Works, Limited is reviewed.

3 3 The need for change

From the authoritative definition of cost accounting, it becomes clear, that by the very nature of its definition, it is a detailed extension of historical financial accounting control. Now historical financial accounting control has already been relegated to third and final place in the -new look- definition of internal control

...../due

due to its inherent time lag. It therefore follows that cost accounting dealing further in terms of efficiency, time, weight, volume etc, connecting the manufacturing operations with the financial operations by interpreting the former in terms of money must, by its very nature and magnitude, increase the normal time lag in order to provide the statistical control data that allows the production unit to be managed on the basis of facts. With the increase in size, and geographical dispersion of the production unit, the task of cost accounting becomes even more complex, and the time lag must increase. This is so much so that it has been found that even with full computerisation and modern EDP data capturing and processing installations, when these results are published the INHERENT TIME LAG HAS CHANGED SUCH RESULTS TO HISTORY. And as modern managements are not historians, but rather the converse thereof, the results of operations, in great detail exactly compiled in all aspects, is of practically no use whatever as a basis for dynamic policy formulation. Thus one of the most valuable means of internal control as an aid for policy prescription and management decisions become obsolete.

cf Prescription is used in this thesis in the context of May G O Financial accounting - a distillation of experience - New York 1961.

3 4 The ultimate medium of control

To re-iterate, the process of transition from conventional cost accounting to cost-finding, shifts the emphasis from rules to hypothesis, and ACCOUNTANTS MUST LEARN TO THINK IN TERMS OF EMPIRICAL HYPOTHESES RATHER THAN LEGALISTIC RULES, i e, STANDARDISED OR NORMALISED RULES.

But at the outset let us state categorically that the above statements, in no way whatever, belittles the importance of control. To the contrary it pre-supposes as a basis that control, in every aspect already propounded here and elsewhere, is not only

...../present

present, but effective and efficient. Further it is very gratifying indeed to see that the control, we are now so familiar with, is gaining momentum throughout the world with businessmen as well as with accountants.

If the cost accountant is to play a meaningful role in the control process of the present, and more so of the future, HE MUST ENSURE THAT THE DATA WHICH HE COMPILES, INTERPRETS, AND REPORTS ON ARE FACTORS OF CONTROL OF PRESENT POLICY BASED ON CURRENT HAPPENINGS, WHICH ARE CAPABLE OF BEING INTERPRETED IN THE LIGHT OF FUTURE EVENTS - COST FINDING. NOT MERELY AS A HISTORICAL SUMMARY OF ACCOUNTING ENTRIES APPORTIONED TO PRODUCTION ON SET PATTERNS AT A LATER DATE (CURRENT COST = REVALUATION ACCOUNTING)

Thus accounting data must keep pace with the business, reflect adequately the realities of the business, and have, at least, as much attention given to their INTERPRETATION as to their preparation.

Originally the orthodox approach to accounting and cost accounting simply divided its functions into two basic categories:-

3 4 1 The stewardship function

This involved the maintaining of records for asset control with particular emphasis on the function of the responsibility to absent owners.

3 4 2 The service function

Which treats accounting and cost accounting as a tool for managerial decision making via the control and planning systems.

This service function has greatly increased in importance in recent years, while the record keeping function, with its inherent historical time lag, has been relegated to the background.

Thus out of the service function of accounting for control has grown the concept of cost finding which as such, it is submitted, is yet in its infancy and will develop more and more as managements

...../and

and practitioners realise the IMMENSE AND URGENT NEED FOR FAST, UP TO DATE, AND EFFECTIVE CONTROL DATA OF DEVIATIONS FROM THE NORM RATHER THAN OF MASSES OF PROOF THAT THERE HAS BEEN NO DEVIATION. Financial accounting and control, from conventional accounting principles which are the result of a historical process, are prescribed to a large extent by law, and thus good practice in this sphere is largely a question of learning and applying the relevant conventional principles and laws.

cf I C A Recommendations on accounting principles. London, I C A issued and revised from time to time.

An outcome of this restriction, from a managerial point of view, is that accounting deals with financial flows classified by natural expense headings, whereas cost accounting considers functional flows. This is in accordance with the recording and interpreting of financial facts in as objective a manner as possible, but which does not aid materially in controlling the large scale production units of today. As we can see from the modern control cycle the ultimate objectives of accounting and cost accounting are to provide data to management to enable it to plan and control operations. This requires data to be classified according to alternate possible courses of action and individual responsibilities. Indeed traditional accounting including cost accounting, is an expensive tool of no real value in itself. Its values are derived from the importance of its objectives, and its success in attaining these objectives.

The effectiveness of traditional financial accounting does not lie in the preciseness of the management information it may produce, but in its authoritative character. The existence of internal control disciplines employees and presents the undertaking's financial structure in an overall model which constitutes a barrier to chaos. The intelligent presentation and classification of accounts, accompanied with comparative figures, percentages, notes, graphs and supplementary information such as funds statements, and trend tables, makes financial statements more

informative and can give A WIDE REVIEW OF EVENTS IN THE RECENT PAST. But as such, are of a limited value in day to day operations, and ARE CERTAINLY ALMOST irrelevant to the future.

Generally however, financial and cost accounts are too incomplete, too infrequent, AND TOO LATE to be of prime value to management, and so contributes but little to effective management control.

3 5 Originally management accounting and control - now Costfinding

Drucker P F (1974) op cit, page 27 states that management accounting was practiced successfully well before the management boom got going. The management boom, in other words, refined, added, modified - but created little. It made accessible to managers everywhere what, up to then, had been the arcane knowledge of a few experts. It made into general practice what, till then, had been the rare exception.

McAlpine T S page 51 submits that the function of management accounting is to -translate- information and facts into figures. He defines further that management accounting operates in three time dimensions: in the past in providing historical profit statements; in the present in controlling operating efficiency; in the future through planned objectives and budgetary control. The principal role of management accounting should be to develop financial statements and cost information for management decisions.

cf McAlpine T S - Profit planning and control - Business Books Ltd, London 1971.

As previously submitted conventional cost accounting is neither equipped nor designed to tender significant management control data to all the various echelons of management which special reference to the shopfloor. It is therefore not surprising that a major evolutionary development within the accounting field should result in the emergence of management accounting, which a decade ago was unheard of, and already, it is submitted in this thesis, should be replaced by cost finding even though THERE IS AS YET NO CLEAR PRECISE DEFINITION OF MANAGEMENT ACCOUNTING AND CONTROL.

Drucker P F (1974) op cit, page 28 states that by the late sixties or early seventies it

...../was

was becoming clear that the knowledge on which the management boom was founded no longer sufficed. Even in most of the foundation areas there emerged needs for new knowledge, particularly with respect to productivity, organisation design and structure, and the management of people. Scientific management could no longer deliver increased productivity. In every country there was a productivity crisis resulting in severe inflationary pressures.

In reality cost finding can be said to be an extension of the definition of management control which the Association of Certified and Corporate Accountants of England state as -the application of accounting techniques to the specific purpose of producing and interpreting information designed to assist management in its functions of promoting maximum efficiency and envisaging, formulating and co-ordinating future plans, and subsequently in measuring their execution.-

cf Brech E F L - Principles and practices of management - Longmans Greenand Co, London 1966.

To this definition, it is submitted, should be added, and emphasised, EXPERTISE BY STRESSING THE PRESENTATION OF COST FINDING INFORMATION IN SUCH A WAY AS TO ASSIST MANAGEMENT IN THE CREATION OF POLICY, AND IN THE DAY TO DAY OPERATIONS, AND OTHER MEANS BY WHICH TO EXPEDITIOUSLY ACHIEVE THE HIGHEST POSSIBLE DEGREE OF UTILISATION OF THE RESOURCES OF A BUSINESS AND YET TO BE A RECONCILABLE, THOUGH NOT AN INTEGRATED PART, OF THE OVERALL ACCOUNTING SYSTEM. THIS IS TO BE ACHIEVED BY MEANS OF A VERSATILE, ADAPTABLE, ELASTIC, AND RELIABLE MEMORANDUM COST FINDING SERIES OF MEASUREMENTS OF TRENDS, AND THE HIGHLIGHTING OF VARIANCES OF ACTUAL FROM PLANNED RESULTS BY THE COMBINED USE OF DIAGNOSIS AND PROGNOSIS, BASED ON MANAGEMENT BY EXCEPTION WITH THE SPEED OF REPORTING OF VARIANCES THE VITAL FACTOR FOLLOWED UP BY NORMAL DAILY, WEEKLY, MONTHLY AND OTHER PERIODIC STATEMENTS REPORTING OF ALL PHASES OF OPERATIONS TO ACT AS A BASIS FOR NORMAL DECISION MAKING AT ANY GIVEN LEVEL OF CONTROL. THUS COST FINDING'S CORNERSTONE IS THE SACRIFICING OF PRECISION FOR PROMPTNESS

OF REPORTING UNTOWARD FACTORS, AS ACCURACY INTENSIVE, BUT OUTDATED INFORMATION, IS ALMOST USELESS TO ENABLE CONTROL IN THE FORM OF IMMEDIATE REMEDIAL DECISION MAKING.

To promote reliable cost finding in any undertaking a main requisite is an accurate, up to date, and realistic functional form of budgetary control at all the levels of the undertakings activities, from major production facets to overheads and selling and distribution expenses. All variances from the norm being reported to management, or its deputies, on a daily, weekly, monthly or other basis. Thus a system of costfinding is not -account book- intensive as it reports on all the aspects of the operations, both inside and outside, the books. Equal attention being devoted to the output yields of furnaces in a steel plant as for instance, to adverse volume variances in the assembly line of an automotive plant.

Reeser C (1973) page 35 op cit, confirms that the objectives of any system of reporting are the following:-

i PINPOINTING STRATEGIC FACTORS

Because of the hosts of data that can be spewed out of a reporting system, it is crucial that the strategic factors relevant to the achievement of each individual plan be identified. Factors are strategic if they make a significant difference between the success or failure of a plan, whereas nonstrategic factors may vary widely from plans, but have little effect on the final outcome. REPORTS SHOULD BE DESIGNED TO FOCUS ON THE STRATEGIC FACTORS.

ii PREDICTING DEVIATIONS

The most meaningful reports are those that indicate deviations from plans before they occur. Such prescience is possible through sophisticated trend analysis, and enables management to do something about potentially unfavourable conditions. If deviations cannot be predicted the NEXT BEST THING IS TO REPORT THEM RIGHT AFTER THEY HAVE HAPPENED. In this way corrective action may be taken to PREVENT A DANGEROUS SITUATION FROM GETTING OUT OF CONTROL. It should be obvious that reports THAT TEND TO BE ANCIENT HISTORY ARE RELATIVELY USELESS. A manager can make little effective response to a report that tells him that plans are completely awry because of an event that went undetected three months before.

iii USING VALID UNITS OF MEASUREMENTS

Events should be reported in valid units of measurement. For example in reporting

engineering accomplishments, it is far more meaningful to report mileposts achieved, as related to those that were scheduled, than to report the current status of expended engineering labour hours. Again actual production as of a certain date is a more useful statistic than percent of plant capacity that was worked in the time period. It is so easy for events to appear favourable when they are reported in one fashion, when, if they are reported in a way THAT MORE APPROPRIATELY REPRESENTS THE CONDITION, THEY WILL BE SEEN TO BE COMPLETELY OUT OF LINE.

Cost data is often of limited use by itself for cost finding purposes. It is the knowledge of the patterns of cost behaviour that is the prime basis for controlling and interpreting cost data. THE BEHAVIOUR RATHER THAN THE ACCUMULATION OF COSTS IS THE FOCUS OF COST FINDING AS OPPOSED TO COST ACCOUNTING. This approach throws light on causes and effects of change. It stresses the future as its control perspective and prepares to appraise this future as it becomes the present. Therefore due to its scene, contributing more to control, than do the other approaches as it endeavours CONTROL AT THE SOURCE.

SECTION II

THE DUNSWART IRON AND STEEL WORKS, LIMITED GROUP OF COMPANIES -

SOME EMPIRICAL ASPECTS AND PHASES OF MANAGEMENT CONTROL THROUGH

COSTFINDING AS INSTALLED IN THIS GROUP

THE NEED FOR CHANGE

(pages 3 42 - 3 52)

CHAPTER III

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- 1 The need for change
- 2 History of the company
- 3 The inadequacy of the management information system
- 4 The mandate and stipulations to meet the need for change
- 5 Factors that limited the extent and efficacy of the change stipulated by the mandate
- 6 The final compromise - the reconciliation between the need for change and the proposed change
- 7 The three aspects of costfinding
 - 7 1 The reporting and evaluating function
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 - 7 3 The recording function
- 8 The culmination of the three aspects of costfinding in SWIFT POLICY DECISIONS BASED ON
EXPRESS REPORTING - THE INLET TO THE HIGHWAY OF SCIENTIFIC MANAGEMENT CONTROL.

3 THE NEED FOR CHANGE

McConkey D E warns that tradition is fine in architecture, furniture, and family trees - if you like it. But he emphasizes that it can be DISASTEROUS TO MANAGEMENT IF ITS EXISTENCE AND USE DO LITTLE MORE THAN PRESERVE THAT WHICH WAS. The author further submits that the traditional approach to management is evidenced by often used expressions such as: -We've always done it this way- or -We're doing fine now, why change?- or -We tried it once and it did not work.- Whether this is true or false can only be ascertained from the -giants of yesteryear- if they can be found!

cf McConkey D E - Updating the management process - American Management Association inc, 1971.

1. History of the company

In order that the prevailing conditions that necessitated changes at Dunswart Iron and Steel Works, Limited be appreciated, it is necessary for the history and the growth of the company to be briefly reviewed in conjunction with the emergence of its management information system.

Already in 1911 it was a registered company with limited liability.

Richards C S page 41 advises that in April 1911 it was converted into a private company -Cartwright and Eaton- with a capital of R20 000 and -proceeded to procure the plant and personnel for the production of puddled and piled merchant iron- from smelted scrap iron only.

Construction was started the same year on a rolling mill. In March 1912 the mill commenced production at the rate of 100/120 tons per month, and at first only half of the output was sold with increasing demand and profits emerging after the first three months, increased production took place. Despite the fact that profits were -ploughed- back, the continued growth in demand necessitated further capital and in 1914 the concern was reorganised and emerged as -The Dunswart Iron and Steel Works, Limited-, with a nominal capital of R50 000.

cf Richards C S - The iron and steel industry of South Africa - Witwatersrand University Press - Johannesburg 1940.

This was an era when, in South Africa more so than elsewhere, the old -Captains of

...../Industry

Industry- reigned supreme. Production requirements predominated the business scene; control was exercised by the personality and rule of thumb methods of the entrepreneur, and the -battling bookkeeper- recorded the barest modicum of facts and figures and no statistics at all - there was no place in the natural order of things for accounting. World War 1 and its demands for steel assisted the company to expand.

Richards C S (1940) op cit, page 42 states that the difficulty experienced in importing during the War led to a great expansion of this business which proved extremely profitable and by 1920 dividends of 400 per cent had been made and the assets were valued at over R200 000. These works supplied the railways with materials for coupling links and more railway requirements were obtained from Dunswart than from Vereeniging. These facts were also succinctly set out in the -Isco- Empire Exhibition booklet 1936.

In 1922, due to the strike with its consequent labour unrest, sporadic local armed conflicts and sabotage, the company received its first real set back.

It was then realised that expansion programmes should have been better phased, based on scientific planning with more emphasis laid on the scientific utilisation of the financial resources of the company. Fresh capital was, of necessity, introduced into the company. These borrowings in turn necessitated changes in the recording function and there emerged a primitive accounts and costing department which laid special emphasis on the payment of wages, and annual cash flows. This state of affairs continued until 1936 when a medium size Mining House acquired control and the first real step forward was taken.

Richards C S (1940) page 267 advised that in 1936 control of Dunswart Iron and Steel Works, Limited was acquired by the Anglo-Transvaal Consolidated Investment Co, Limited. The share capital was also increased.

New accounting and costing systems were installed, these systems being exact replicas of those enforced in the mining industry. On the accounting side the Head Office ledger and the Works ledger

...../were

were introduced replete with multicolumn journals, transfer journals, allocation journals and cost journals which accumulated all costs under five heads or cost centres similar to that of the gold mines. In this instance however the cost centres were appropriate to a Steel Works viz:-

- i Furnaces
- ii Rolling Mills
- iii Foundry
- iv Despatch
- v Works General

The secretarial and buying department functions were taken over and incorporated in those of the Head Office. Perpetual inventory records for consumable stores were introduced, again similar to that of the gold mines, and the answer to irregularities was sought in the Internal Audit department reporting to the Holding Company. Monthly reporting of a sort was introduced. World War II, 1939 - 1945, gave an impetus to the fortunes of the company and further expansion schemes resulted. This haphazard state of affairs continued until 1952 when control again changed hands.

The new board of directors laid particular emphasis on production and expansion, but with one exception paid little attention to the accounting and costing functions. All expenditure and costs that could not specifically be attributed to one of the five heads listed previously were charged to the furnaces. The reason for this, as was succinctly stated by the former Works Secretary, being -that as the product of the furnaces flowed throughout the plant it automatically and equitably distributed all costs to those concerned-.

Seen in the light that there were, apart from the overhead structure, eleven auxiliary production departments such as Gas Producers, Overhead Cranes etc, and seven Service departments such as Machine Shops, Roll Turning Shop etc, included in the cost of the liquid steel produced, it was

small wonder indeed that total and unit costs were rather startling and comparisons with other Steel Plants, in South Africa and elsewhere, were impossible. Coupled with this the distorted monthly reporting was about three months late and the annual audited accounts barely met the six months statutory deadline. The stage was now set for what was to follow. The profitability and the liquidity of the company deteriorated to such an alarming extent that with the next cyclical downturn of the economy it was change or else!

2 The inadequacy of the management information system

As will be seen from the above outline and review of the emergence of the company's management information system in conjunction with its growth, little, if any, recognition was accorded the financial and costing functions as instruments of control. Apart from a handicapped start the growth of these functions did not keep pace with that of the productive facilities i e, the assets. That the company performed as it did can probably only be ascribed to the abilities of the entrepreneurs - the Captains of Industry - that built it. This is a common enough phenomenon at the inception of any business concern, but one that often sees the end of the concern either with the passing of the entrepreneur or with its growth and geographical dispersion. Such was nearly the case with this undertaking. Management, no matter how skilled and scientific it is, cannot manage without the necessary information on which to base its scientific decision making and policy formulation function and the means by which to ensure that its instructions have been properly and correctly carried out.

Petrof J V, Curusone P S and McDavid J E (1972) op cit, page 8 agrees fully that if management information is not being generated, management skill and ability cannot cure the deficiency. They state that, in spite of its ingenuity and creativity, human judgement is not infallible. It can never be eliminated from

...../management

management decisions, but it can be reduced in scope by increasing the amount of factual information and analysis that surrounds a particular problem.

Sometimes there is a tendency to think that such a systematised approach to making business decisions can come only at the highest levels of corporate giants. Nothing can be further from the truth. It is true that larger corporation executives arrive at their decisions systematically, but this is not inherent in size. DECISION MAKING IS LIKE SWIMMING. ONE DOES NOT SWIM DIFFERENTLY IN A SMALL POND OR A LARGE LAKE.

INFORMATION IS THE RAW MATERIAL OF DECISION MAKING, and if this information is not being generated, disseminated and skilfully used for managerial control and planning, management skill and ability cannot cure the deficiency.

Reeser C (1973) op cit, page 36 states that an essential feature of systems theory is FEEDBACK, which means that the systems network is regulated by the information produced by it. A simple example is in the way a thermostat works. When the temperature in a room drops below a predetermined level, the thermostat communicates this information to the heating unit, which increases its heat output, and the temperature rises. In similar fashion, the process is reversed when the temperature becomes too high. An important aspect of systems theory is its emphasis on feedback channels through which outputs are evaluated and compared to established standards. When differences become apparent between outputs and standards, the measuring mechanism communicates this fact to the device that regulates the inputs. Inputs are then adjusted to change outputs, while the feedback process continues.

For the provision of the management information the existing system was weak, totally inadequate and, more often than not, completely misleading. All these factors were even further worsened by the abnormal time lag inherent in the existing system.

Two further exogenous factors that materially influenced the profitability of the company were now felt more than ever before. Firstly there was the change in the demand pattern and secondly the controlled selling price of steel! Although these created problems common to the steel industry as a whole, the other undertakings were better equipped to cushion the resultant adverse effects by changes in their production, discontinuing uneconomic lines and sizes and instituting

economy campaigns. All these precautionary and disciplinary measures were made possible by the reasonable effective functioning of their accounting, cost accounting and management reporting systems.

As for the company under review, these new problems and factors now further challenged its management's ability to manage and intensified management's responsibilities. Management's already onerous accountabilities for the optimum use, safeguarding and protecting of the assets and income became ever more exacting. This in turn focused management's attention on the weaknesses and shortcomings of the existing management information system and brought home the vital necessity of an increase in the efficiency and effectiveness of its systems by extending the nature, range, depth and types of controls at its disposal. On the success of management's endeavours to achieve these objectives depended the very survival of the company and the time was now ripe for a complete re-orientation in the thinking and approach of management to the introduction and installation of a costly scientific management information, reporting, control and recording system.

McGregor D (1967) op cit, page 184 in his chapter on the management of differences aptly proves that in conflict there is advantages as well. He states that virtually every successful innovation - technical or social is the outcome of conflict between the new and the old. Even the broadest kinds of social progress can be perceived in this light. Competition and conflict are pervasive in all social inter-action. One important reason lies in the very nature of man. Winning, overcoming obstacles, solving problems are the source of fundamentally important rewards. The evolutionary roots of this phenomenon are obvious.

3 The mandate and stipulations to meet the need for change

In view of the circumstances enumerated above the logical, if not the only, action that the management of the company could take was to negotiate urgently for the design and installation of a modern, scientific and effective management information system.

This was the mandate that was given in general. The only stipulations that were made in particular were:

3 1 That the reporting aspect of the management information system be presented in the same format as set out in the Uniform Costing System applicable to the German Steel Industry.

The object here was to make possible comparison of the various components and elements of the local cost structure with those applicable to the German Steel Industry.

3 2 That management information, in the form of Cost Statements, be published on a monthly basis by not later than thirty days after the end of that month.

3 3 That a basic system of budgetary control be introduced to act as a guide to management in the day to day operations of the undertaking.

4 Factors that limited the extent and the efficacy of the change stipulated by the mandate Research revealed the following shortcomings and limitations to the application of the German Uniform Costing System in South Africa as envisaged by the mandate of the directors:

4 1 The German Uniform Costing System laid stress on the format of the information published. It set out in perfect form the components of cost for each production cost centre replete with comparative figures for the previous month and year to date cumulative totals. But apart from this every undertaking concerned had its own methods, definitions and derivations in determining the data and the compilation of the components and segments of cost so lucidly reflected in the Uniform Statements.

4 2 The Uniform Costing System for the German Steel Industry made no differentiation between Fixed, Variable and Semi-Variable costs. Later discussions with an authority on this subject revealed that these types of expenditure were not unknown

...../to

to the German authorities. When the necessity arose for them to investigate data under these heads, this task was delegated to a committee who defined them in the light of the prevailing circumstances! Further discussion with this authority also revealed that our definition of a fixed cost being relevant to a unit of time was seen by them as being fixed to a unit of production i e, directly opposite!

4 3 In Germany is no statutory audit; no Public accountants and Auditors Board; no equivalent to the 4th Schedule of the Company's Act of 1973; and where Auditors are appointed they reported only to the company's management. Obviously therefore the stringent statutory requirements of South African legislation prohibited many phases of the German Uniform Costing System and certain compromises had to be made.

4 4 The futility of comparison of local components of cost to similar items of overseas costs was also obvious. This again necessitated further compromises and changes.

5 The final compromise - the reconciliation between the need for change and the proposed change. Finally it was agreed that the reporting aspect of the new management information system would be based as near as possible on the cost statement reporting format of the Uniform Costing System. Apart from this a costfinding system based on the following three aspects would be devised and implemented viz:-

5 1 The reporting and evaluating function

This in turn to comprise two aspects

- a Regular routine reporting of all phases of the operation by means of Cost Statements, Operating Reports, Statistics etc, at set daily, weekly, monthly or other periodic intervals.
- b Emergency reporting of untoward factors.

These two aspects were to culminate in a system of Early Warning Signs with the

...../emphasis

emphasis on speed of presentation, and reported information was to be only sufficiently accurate to be appropriate to the magnitude of the remedial action.

5 2 The control function

5 3 The recording function

All culminating in -

SWIFT POLICY DECISIONS BASED ON EXPRESS REPORTING - THE INLET TO THE HIGHWAY
OF SCIENTIFIC MANAGEMENT CONTROL.

THE BASIS AND OBJECTIVES

OF THE NEW SYSTEM

(pages 4 53 - 4 73)

CHAPTER IV

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 - i The evaluating and reporting function
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 - i The application of control as the instrument of safeguarding and protection
 - ii A means of rapid reporting of essential information to allow - live - supervision at the source
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4 THE BASIS AND OBJECTIVES OF THE NEW SYSTEM

1 The Basis

The management information, control and reporting system installed at Dunswart Iron and Steel Works, Limited is based on costfinding which consists of three major aspects or functions viz:

i The evaluating and reporting function

Reeser C (1973) op cit, page 35 in his chapter on systems management states that in the last decade there were some new ideas about old theories, but the only new theory developed in the 1960's, and one that generated quite a lot of attention, is systems management.

ii The control function

iii The recording function

1.1 The evaluating and reporting function

cf For scope, frequency and nature of the management information system in operation refer annexure 1.

This consists of two aspects viz:

a Regular routine reporting of all the phases of the entire operation by means of cost statements, operating reports, statistics etc, at set daily, weekly, monthly or other intervals.

b Emergency reporting of untoward factors

These two aspects culminate in a system of EARLY WARNING SIGNS with the emphasis on the speed of presentation. The cardinal rule here is that the reported information should only be sufficiently accurate to be appropriate to the magnitude of the remedial action.

Dew R B and Gee K P (1973) op cit, page 88 states that if the area of

...../uncertainty

uncertainty is deep, if the number of possible alternatives is large, then the need for information will be great - i e, all possible information which might throw light on the problem, or which might help to influence the results of a decision.

Adverse variances from the norm are reported immediately. As costfinding is not -account book-intensive these variances cover all the aspects of the operations - BOTH INSIDE AND OUTSIDE THE BOOKS! Equal importance is attached to numerical variances as to monetary variances. Cost data is often of limited use by itself for costfinding purposes as it is the knowledge of the patterns of cost behaviour that is the basis for controlling and interpreting this data. It is the behaviour rather than the accumulation of costs that is the focus of costfinding as opposed to conventional cost accounting.

The basis of the approach of the new system is to throw light on causes and effects of change. It stresses the future as its control perspective and prepares to appraise this future as it becomes the present. Hence due to its scene contributing more to control as it will endeavour to effect control at the SOURCE.

1 2 The control function

The basis of this aspect of the new system is that internal control consists of all the measures adopted to safeguard and protect assets and income, and to ensure optimum utilisation of the production facilities at all times and at all levels of production, and it is, ipso facto, a management control because it encompasses the same company-wide sphere covered by management authority and responsibility. Control is therefore no longer limited to certain spheres only such as accounting or administrative control. As stated above all controls are management controls, and management must assume full responsibility therefor. But as management, owing to the multiplicity of measures entailed, cannot exercise personal supervision over all levels and branches of the

...../undertaking's

undertaking's activities, it must delegate authority in a descending order of seniority. The basic goal in the exercise of the control envisaged by the new system is therefore to cover the whole field of activities i e, to supervise that the assets are used in pursuance of the objectives of the undertaking and are accounted for, and that income is earned with the maximum economy in the application of the assets. The need for an efficient system of internal control is thus obvious as it is the most important aid at the disposal of the management in the fulfilment of its control functions over both policy making and the ascertainment of the extent to which subordinates have carried out their instructions and achieved the targets set for them.

Koontz H and O'Donnel (1955) op cit, page 483 already some two decades ago emphasised the importance of policy formulation. They stated that policies can be defined as based guides to thinking and action and, as such ARE A MAJOR INGREDIENT OF ALL PLANS. THEY FURNISH THE GUIDING ELEMENT THAT GIVES DIRECTION OF PLANS, JUST AS PLANNING PREMISES PROVIDE THE BACKGROUND AGAINST WHICH PLANS ARE MADE.

The control function as well as the reporting function is based on the fact that the success or failure of an undertaking is determined not only by the degree of accuracy, efficacy and effectiveness of management policy decisions, but also by the rapidity of the reporting on which management base its policy decisions. Following this hypothesis to its logical conclusion it becomes clear that swift policy decisions based on express reporting - the inlet to the highway of scientific management control - is the key to success. Basically to achieve this the control function is so applied and promoted as to ensure:

- 1 2 1 That all control measures are absorbed into an integral part of the homogeneous whole of the activities of the undertaking;
 - 1 2 2 That control flows into a heterogeneous pattern of differentiation of set functions.
- Chronologically viewed:

- a the origin of the managerial or entrepreneurial team;
- b the postulation of an infrastructure to achieve the goal, whether it be premises, buildings re-inforcing ancillaries etc;; and

- c the postulation of potential to provide policy for activities as well as for control measures.

All culminating in the accounting to management, through accountability, by means of an effective expressway of management reporting by the SPECIFIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL FOR INSTANT DECISION AND ACTION BASED ON BOTH EXCEPTION AND OBSERVATION.

McGregor D (1967) op cit, page 162 emphasises that sound decisions AND THEIR SUCCESSFUL IMPLEMENTATION, whether related to the internal operation of the team or the performance of its primary task, must take into account ALL THE RELEVANT facts.

In itself, control as a function consists of the twin or dual aspects of:

- i Static control - basic and near automatic - the foundation for the dynamic
- ii Dynamic control - flowing from the static

This concept of control is that of Rademan C F O who divides contemporary control into these two broad aspects.

cf Internal control op cit.

And by seeing these two aspects in the light that they cover the same area that management responsibility covers, it becomes clear that internal control is actually management control. The management control, sired of contemporary exigencies, where there are interwoven in every phase of the transacting, recording, and custodianship functions basic built-in automatic divisions and subdivisions of these twin or dual streams of static and dynamic control; whose tentacles, negative or positive, tangible or intangible, real or psychological, permeate the spectrum to safeguard, guide and protect the undertaking. Which components all converge to form the submerged rails that the static - basic and near automatic control - run's on; passing the -stations- and -intersections- from where the dynamic management control -embarks- from: i e, the rails that together culminate in scientific management policy formulation and decision making, with appropriate remedial action - if necessary - at the source.

In closing this section on the control function it must be emphasised that management control covers the spectrum of the company's activities in its entirety and therefore the static and dynamic aspects form one inseparable whole. Working in harmony with each other, completely interrelated, with the static - basic and near automatic control - forming the foundation for the dynamic.

1 3 The recording function

This function is based on the strict application of the principle of the division of duties and responsibilities between the transacting, recording and custodianship aspects.

The strict application of this principle ensures the greatest possible extent of AUTOMATIC control over the accuracy and reliability of the accounting data. All recording, reporting, and data capturing is effected by an integrated mechanised accounting system which provides a pattern of data processing which is effective and simple and is based upon the function - purpose or activity - as the hub of this theme.

There is no expenditure which is not occasioned by a specific and identifiable purpose or function. The identification of the tributary purpose being effective in its departmentalisation and this is based on the managerial tree of responsibility. As stated previously each division and sub-division of cost is based on an accountability that is functional, with the purpose or activity, as the hub of their theme. This is an unconventional theme which cuts diagonally across the normal accounting flow much as an audit procedure does. Thus requiring right from the inception an accounting flow for expenditure according to responsibility i e, the departmental function and not one determined by the nature of the expenditure. There is therefore a departmental, or sub-departmental head, that is responsible for every item of expenditure making up a given function and there is no expenditure which is not occasioned by a SPECIFIC AND IDENTIFIABLE purpose or function.

Therefore even though similar types of expenditure may be incurred in different functions there is effective control of each function WHERE IT IS INCURRED, and here the cardinal rule of the system is made not only possible, but also effective as there is

...../an

an official responsible for every item of expenditure incurred by his function on the basis that supervision is CONCENTRATED AT THE SOURCE OF ALL THE ACTIVITIES. In order to achieve optimum results from the operation of this recording function each division and sub-division consists of cost and expenditure grouped and collated in a set pattern all of which are based on a scientifically designed and functional plan of accounts and cost centre codes.

cf Refer annexure 2.

The same basic principle applied to the recording function as applied to the undertaking as a whole, i e, no one individual or unit is in complete control of all the phases of a transaction, nor may an individual or a unit carry out an assigned responsibility without:

- i Co-ordinating it with the rest of the undertaking
- ii Conforming to prescribed policies and procedures
- iii Being responsible for the results according to assigned authority
- iv Being subject to impartial examination, questions and appraisal by the representatives of management.

2 The objectives

The costfinding and management information system to be installed at Dunswart Iron and Steel Works, Limited was to provide the means, aids and techniques to assist management to shoulder its responsibility for the prosperity, growth, financial performance and very survival of the undertaking. As costfinding encompasses the same company-wide sphere covered by management authority and responsibility it is synonymous with control - the management control propounded in this thesis. The control that supersedes and consolidated the relatively static accounting and administrative control of the past and extends it to the present dynamic one which covers, penetrates and permeates the entire spectrum of the undertaking's activities.

The objectives of this new system were to provide:

- cf By the courtesy of the Chairman and Board of directors of the Dunsward Iron and Steel Works, Limited Group of companies - a brief review of certain objectives of the fully mechanised and computerised integrated financial and costfinding systems installed at this undertaking by the author. Also referred to in an unpublished Masters Dissertation 1970 - Internal Control etc, op cit (UNISA).

2 1 A management control and information system to steer the undertaking

This is a financial forecasting and planning system to provide management with a comprehensive basis for making advantageous decisions on capital and resource management. To promote scientific financial planning and decisions by providing a flexible multiforecasting system; to assist in projecting future financial statements and capital requirements; to facilitate the evaluation and comparison of past production and financial performance with present day to day operations; to enable the generation of forecasts to facilitate immediate policy making decisions. All of these to culminate in a scientific management information system, with express management reporting, to assist the management policy formulation and decision making function with regards:-

- 2 1 1 The development of long and short term policies and plans
- 2 1 2 The analysis and determination of operational and financial alternatives
- 2 1 3 The compilation of simple, analytical or synthetic divisional, functional, and company budgets.
- 2 1 4 The setting of management priorities and policies
- 2 1 5 To facilitate the comparing and contrasting of historical data as a basis for prognosing the future - product lines, operations, market demand and sales forecasting, policy formulation, plant equipment and retooling, labour availability and policies, inventories, geographic dispersion etc,
- 2 1 6 To improve and assure consistency in the overall financial and planning programme
- 2 1 7 To improve efficiency and reduce the hidden costs of decision making and control by providing current data from an easy to use analytical and functional system with which to evaluate financial, operational or other alternatives.

- 2 1 8 To make possible the consideration of alternatives in the planning of methods and levels of production, finances, inventories etc,
- 2 1 9 To utilise the data that result from D P data collection, collation and processing for the prognosing of future financial and other conditions and assumptions as an effective tool of management control as follows:

- a In the application and development of multiple sets of meaningful forecasts based on various levels and types of production
- b In the evaluation and interpretation of the effect of adverse factors on future conditions
- c To recognise in advance danger impulses and signals of untoward or favourable circumstances and contingencies in the company, the economy or the country.

2 2 The application of control as the instrument of safeguarding and protection

2 2 1 Control - the axis

Internal control IS all the measures adopted to safeguard assets and income, and to ensure optimum returns at all times through the best utilisation of the production facilities at all levels of production. Its scope is autonomous with the management function and, as such, permeates throughout the spectrum encompassed by management authority and responsibility. In the implementation of all the systems of control the emphasis, of necessity, is to fall on supervision, and the basis of effective supervision is to be that it is carried out at the source of the activity or function.

In itself control assumes many guises, consisting of a multiplicity of phases, forms and facets, active and passive, tangible and intangible. With regard to the management information and reporting system to be installed, internal control is to be as much the watchdog, the security screen that protects and safeguards, as is the Security department of the undertaking. In fact internal control is to be as much part of the management responsibility as is any other facet of the production process.

2 2 2 Reporting - the means

Management information needs, aids and techniques differ from industry to industry, and even vary within undertakings in the same industry. There are many factors to consider, for example, the information requirements of a single industry group are problems of depth, whereas conglomerates' management has to cope with problems of width. But whatever the type of organisation, and whatever the management reporting or information system, the basic

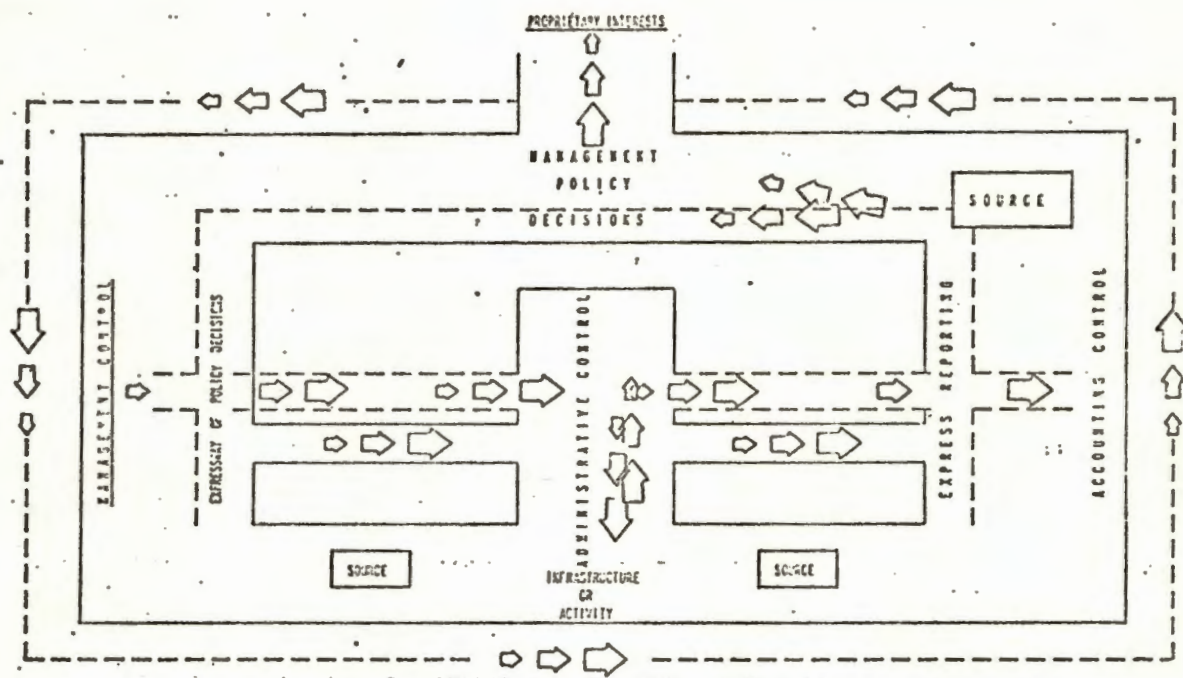
...../requirement

requirement is the same - a dynamic control system that enables management to plan the future with success instead of waiting for events to overtake them. Thus success or failure is determined, not only by the degree of accuracy, efficacy and effectiveness of management policy decisions, BUT ALSO BY RAPIDITY OF REPORTING ON WHICH TO BASE POLICY DECISIONS. Therefore swift policy decisions based on express reporting - the inlet to the highway of scientific management control - is the key to success. But must always be based on the basic objectives of internal control being scientifically and correctly applied

Koontz H and O'Donnell C (1955) op cit, pages 486 - 488 already pointed out some twenty years ago that management policy formulation and decision making covered the functions of planning, organising, staffing, directing, and controlling, i e, the spectrum.

(Swift Policy Decisions Based on Express
 2 2 3 The Axis + The Means = (Reporting - The Inlet to the Highway of
 (Scientific Management Control

GRAPHICALLY DEPICTED



2 2 4 The twin aspects of the umbrella that safeguards and protects

The techniques and components that structurise scientific management through costfinding, as to be applied in the Dunswart group of companies, are all founded on two aspects of control -

- i Near automatic and basic control
 - ii Dynamic management control
- a Near automatic and basic control

Being before the fact, everpresent, and fully operative in all the phases and stages of the day to day operations of the undertaking - fully incorporating the internal check of yesteryear as well as incorporating the new look accounting and administrative controls that -arrived- with the beginning of the seventies - the decade of innovation and progress. As set out previously the continued existence, efficacy and effective functioning of this aspect of management control is AT ALL TIMES AN ABSOLUTE BASIC PREREQUISITE for the scientific and successful operation of the undertaking. It is virtually the submerged rails that crisscross the spectrum on which the -train- of all routine self checking operations runs, without which, i e, the train, any form or application of dynamic management control, no matter how sophisticated or how far advanced, is doomed. This is the passive twin whose omnipresence is axiomatic with the very existence of a successful undertaking

- b Dynamic management control

This is the active twin, essential for the scientific day to day conducting of the undertaking by the senior and junior strates of management through dynamic policy and decision making based on prognostic management reporting of current events. In fact -live- supervision exercised at the source.

That all the forms and the facets of the twin aspects of the umbrella that safeguards and protects is so interdependent, and interwoven, that no positive dividing line can be drawn between near automatic and basic control or dynamic management control is accepted as indisputable. One is the foundation, yet the mortar that binds the bricks rests not only upon the foundation but equally upon each succeeding layer of bricks: one is a pre-requisite of the other, and each is complementary to the other. But for the purposes of this thesis it will be attempted to review empirically these two forms of control applicable in the company, in two sections. One, illustrating the omnipresence of near automatic and basic control, and the other stressing the role of early warning systems - dynamic management control. More emphasis is laid upon the dynamic management aspect of control, NOT because its importance in any way overshadows that of the ever-present, before the fact, near automatic and basic aspect of control, but solely because costfinding is the newer aspect. Thus costfinding is the management tool of tomorrow that we have to -sell- today as it is the successful combination and application of these two aspects of control that culminate in swift policy decisions based on express reporting - the inlet to the highway of scientific management control.

- 2 3 A means of rapid reporting of essential information to allow -live- supervision at the source

This will endeavour to provide management with a rapid information service on which to base its policy formulation and decision-making function and by means of which to effect a compromise between the contemporary historical and accuracy-intensive management

...../information

information services and the high cost -paper war- installations which provide a wealth of information on every possible aspect of the undertaking and its production facilities. The type of system that drowns the scientific management potential by submitting a flood of reports on all aspects and phases of the operations. ALL of these reports being submitted as frequently as possible and attaching equal importance to non-deviations as well as deviations from the norm.

cf Author's note - -analysis paralysis- the corollary to Parkinson's -law-?

The integrated cost-finding system envisaged for this group of companies would therefore endeavour to report only the exception, and not the rule, leaving routine reporting to follow at a later date. This system would also be based on the theory that it is not of much real value to -employ a policeman at R50 per week to guard over R5 worth of merchandise-. Thus the doctrine of speed of presentation - the essence of -live- supervision at the source - is at all times to be governed by the magnitude of the policy decision to be taken. This doctrine has as a basis the requirement that the accuracy of the information reported should at all times only be equal to the magnitude of the decision to be made. Once the -early warning sign- has been given and the relevant strata of management alerted, the pertinent information, appropriate to the required action, can be selected on an ad hoc basis. If necessary selection can be made at crisis level.

Alternative courses of action can be planned.

Koontz H and O'Donnell C (1955) op cit, page 507 define planning as the selection from among alternatives of policies, procedures, and programs. The selection of alternatives requires the establishment of planning premises, since it must be against a background of existing and forecast facts, policies, and other plans that any course of action should be considered. The world of business planning is a complex of plans already made, premises internal and external to the firm. The adoption of a single course of action can seldom be judged alone, as it must be geared with other plans of the firm or these plans changed to be consistent with the new plan considered.

Further, the type and degree of the information collected, collated and submitted is at all times to be DETERMINED BY THE RECIPIENTS' LEVEL OF AUTHORITY.

For lower levels of management - both line and staff - physical measurements are to be the basis of costfinding reports. Shopfloor data - input, output, intermediary stocks, delays, throughput, variances, stoppages, breakdowns etc, are to be reported on in terms of units and NOT value. One of the most important aims of the proposed management information system is that reported information should only be SUFFICIENTLY ACCURATE TO ENABLE THE APPROPRIATE REMEDIAL ACTION TO BE TAKEN.

cf -This is a lesson which many accountants still find difficult to learn-- per Howitt A W MC, FCA, FMCA, J Dip MA, FBIM, FIMC, senior partner in Peat, Marwick, Mitchell and Co, consultancy branch, London. In a paper - -Information needs of Management- given to the 10th International Congress of Accountants in Sydney 16 - 20 October, 1972.

Therefore speed of presentation is of the essence, and to promote -live- supervision at the source the following general time limits were to be adhered to:

cf For a detailed summary of the frequency of the management reporting operative in the company - see annexure 3.

	<u>Frequency of submission</u>	<u>Time of submission</u>
i	Per shift	First hour of the following shift
ii	Daily	First hour of the following day
iii	Weekly	First day of the following week
iv	Monthly	First week of the following month
v	Yearly	First month of the following year

In general, daily and weekly information is to be provided for line management up to foreman and chargehand level, and bi-monthly and monthly information is to be provided for middle and senior management to evaluate the success of the operations for the preceeding period. All the above types of information presented are concerned only with the undertaking's internal operations,

...../but

but every endeavour is to be made to discourage the undertaking from becoming production orientated and thus tending to be introspective.

The costfinding system of management information is also to be flexible and adaptable to allow for changes in existing conditions and techniques.

In concluding this section it can therefore be said that costfinding information is the basis for the company's overall plan.

cf In both the accounting and cost accounting senses.

Once the plan has been agreed, staff and line managers use the information costfinding collects, collates and presents from all the other sources in the day to day operation of their functions.

cf Costfinding in its true sense.

Simultaneously the basic and near automatic control aspects provide a check on all operations, and dynamic control - early warning signs - initiates the necessary corrective action when variances from the plan or the norm are indicated. Thus the majority of the -on the spot- information that allows -live- supervision at the source is obtained from outside the sphere of -accounting information-.

2 4 A definition of the theory of management information on which to base the reporting system

It is in the utilisation and disposition of resources, and the assessment of the outcome from their application, that the judgement/decision aspect of the management control process comes most into play. To accomplish this management needs data - facts, and figures, economic, physical and financial - to provide a base from which to formulate plans and against which to exercise the control of performance and progress. Such data is the management information which enables management to:

- a Function scientifically in the sequential action of collating the relevant facts;
- b considering and judging them;
- c determining the conclusion to which that consideration leads;
- d provisionally testing the conclusion; and
- e finally issuing a policy decision in the light of the test.

This policy decision becomes the plan, and when the performance data reveals deviation from the prognosis, then the policy is reviewed in the light of the new facts and revised policy decisions can be scientifically made. The feedback cycle is thus complete.

Because data is at the essence of this action and reaction, management information is needed in different forms in different parts or levels of the organisation, and data procedures have to be appropriately worked out to meet specific requirements. Whether management information is considered in theory or in terms of practice, such information is an essential feature of the management process, absorbed primarily in the elements of planning and control, with a secondary contribution in co-ordination.

In consequence, the procedures that are designed to give effect to the information are the means by which the management exercises its judgement in formulating decisions: the scope and extent of these decisions are determined by the defined responsibility which is delegated or allocated to its role, and are thus reflected by the divisions and levels of the organisation structure.

Many of management's decisions will be routine, pertinent to the daily and weekly activities under its jurisdiction; if errors of judgement occur such errors can normally be corrected at low cost.

Other decisions will refer to major action and will be ad hoc to situations of importance where errors of judgement could be capable of correction only at a considerable cost. Sound principle requires that the data availability must be appropriate to the significance of the decision: where the cost of possible errors is high, more information is justified than where the error potential is insignificant.

In terms of practice, statistical or mathematical techniques afford their true value to management in this respect because they facilitate the provision of the minimum information pertinent to that situation; e g, sampling instead of detailed calculations. Very important too is the principle that, for decision purposes, data is required of expected future conditions more than of historical events. Management decisions are therefore more concerned with choices as to the basis of future actions, whether these are short or long term, and thus management must be kept informed of the possible outcomes of such alternatives. It is therefore essential that data must provide not only the normal information required for policy formulation and programme forecasting, but must also be in such format that an assessment and evaluation of the assumptions that were made in deciding between the alternatives can be made.

Again the rule will be that the greater the significance of the decision to be made, i e, the higher the level of management making these decisions, the more accurate the information must be. Further, management is not only specific to each level or section of the responsibility that is delegated but it is also pertinent to the co-ordinated operation of the management process as a whole within the undertaking with regards to the elements of planning and control.

2 5 A management information system that will allow swift policy decision based on express reporting to be the means of access to the highway of scientific management control

Koontz H (1971) op cit, page 44 states that one of the most exciting tools that has swept across the managerial scene in the past decade is the system of appraising managerial performance AGAINST ACCOMPLISHMENT OF PRESELECTED VERIFIABLE OBJECTIVES.

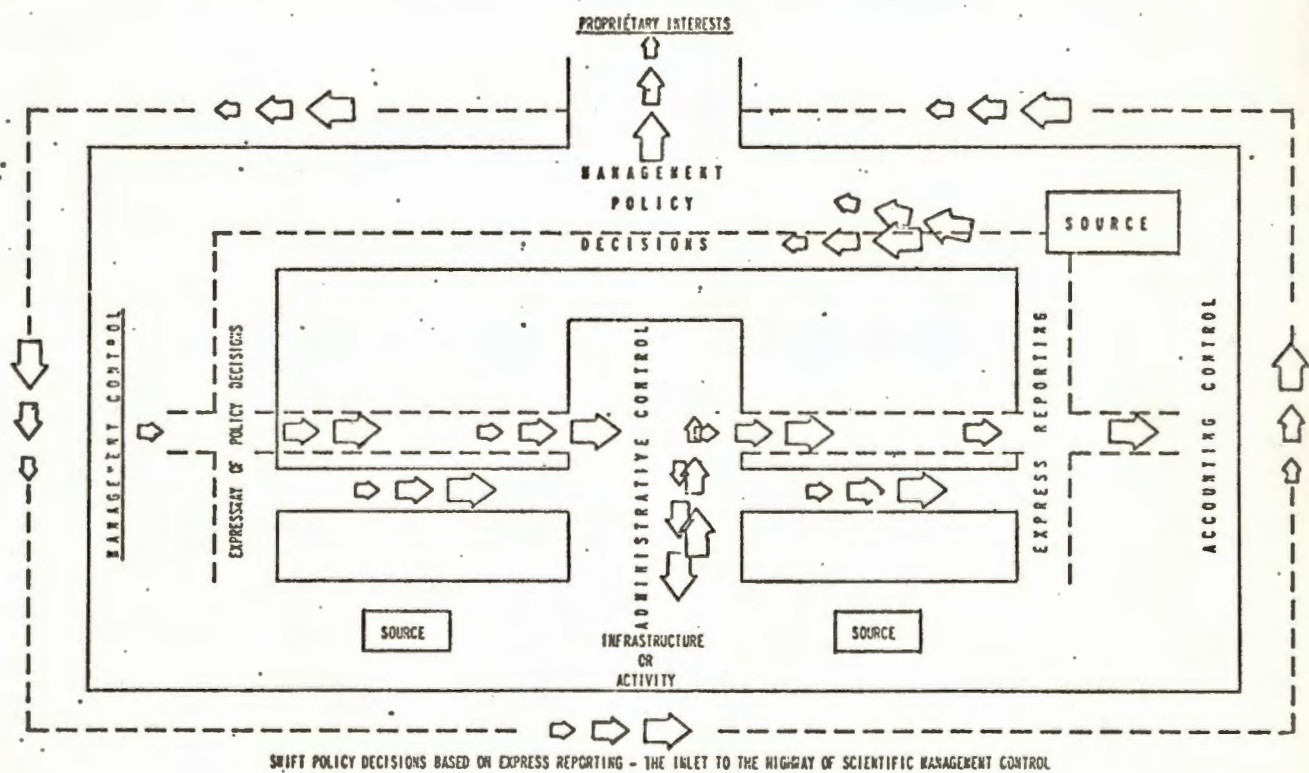
On page 48 Koontz H continues that it has been noted at various points that to be meaningful objectives must be verifiable. The easiest way to get verifiability is to PUT GOALS IN QUANTATIVE TERMS. Instead of saying a goal is to make a profit, we must say that it is to make \$10 million in profit after taxes in 1972 by selling \$200 million of products - with \$40 million in product line A, \$60 million in product

...../line B

line B, £20 million in product line C and £80 million in product line D - at a gross profit margin of 33%, a net profit before taxes of 10% and a return on stockholder's equity of 18%. For line management their goals will be further quantified into, for example, the number of items to be manufactured and the percentages of scrapped production. COSTFINDING PIONEERED THESE PRINCIPLES IN 1964.

To achieve this objective the management information and control system envisaged for the undertaking was based on the following flow diagram

cf As this flow diagram is the basis of the entire costfinding system installed at Dunswart Iron and Steel Works, Limited, it is, again reproduced here.



A prerequisite for success in the operation of this type of costfinding - management information and control system is that it must basically consist of the three aspects or functions as previously defined viz:-

- i The evaluating and reporting function
- ii The control function
- iii The recording function

All of these must function in such a completely inter-dependent and inextricably interwoven fashion that they form one inseparable whole or spectrum.

In turn this spectrum or process is divided into two further broad facets of:

- i Prognosis
- ii Diagnosis

2 5 1 Prognosis

cf For a detailed review of the budgetary control system installed at Dunswart Iron and Steel Works, Limited refer Internal Control op cit Chapter V - Section III (UNISA).

This is the facet that is concerned with the future - both near and not so near. It consists of a comprehensive system of functional and sectional budgetary control which covers every aspect of the undertaking and its operations.

Sectional control is exercised by separate master budgets which are compiled for the administrative, commercial and production functions. These budgets are prepared on a simple, analytical or synthetical basis depending upon their purpose. Each master budget is submitted to management for final acceptance and, when it is approved, it becomes part of the master budget of the undertaking as a whole and may not be changed without prior approval by management. As such this final master budget becomes the basis for the undertaking's co-ordinated action for the budget period. Budgets are compiled on an annual, three-yearly and five-yearly basis. The longterm budget, i e, the five-yearly one merely sets the target that management wishes to achieve, and the three-yearly one indicates whether this target can be achieved, whether it must be changed, or whether the course of the undertaking must be changed.

2 5 2 Diagnosis

a Value and unit cost control

This is the facet that is concerned with the historical aspect. Here the actual monthly costs of each cost centre, department and function are tabulated, compared and contrasted with the relevant budget for the month and for the year to date. Variances of unit costs, processing costs and material usage are disclosed per function, and any significant variances, both adverse and favourable, are reported on in an untoward factors report.

In order to minimise any reporting delays a monthly cost-finding and accounting timetable is rigidly adhered to and, in normal circumstances, the preliminary operation results and income estimates for the calendar month are ready for circularisation by noon on the third working day of the following month.

Within twenty-four hours after the publication of the preliminary operation results and income estimated, the actual results for the calendar month are published wherein any deviations from the estimate are revealed and reconciled. The third step in the diagnosis of the monthly results is the publication of the detailed operating results for the month compared and contrasted per unit, of the production throughout the entire plant with the previous month, the year to date and the target - i.e., the budget. Each production and each cost centre is similarly analysed to reveal:-

- i The total input flow and all the relevant costs in detail
- ii The total output flow and all the relevant costs in detail
- iii The yields of every production process per shift
- iv Processing costs - in total and per unit of good production
- v Material costs - in total and per unit of good production

The monthly preliminary operating estimates and income statements mentioned above, with the subsequent reconciliation of differences - if any - have virtually eliminated the inherent time lag of the traditional historic double-entry accounting control because of the speed of presentation.

b Shopfloor numerical control

Independently, but simultaneously, all materials consumed in production - from the input for processing (charge unit and mass) through to the final output (production unit and mass) - are recorded on preprinted and numbered data sheets for every production cost centre and subcost centre throughout the entire production processes of the plant. In a continuous or flow plant of this nature, with its many intermittent phases, the final product of one production unit becomes the raw material of the next production unit with buffer stocks of work in progress held at every stage through to the final finished product. The recording of and reason for stoppages is also noted. This shopfloor recording process is to operate for every shift worked in every section of the plant, and at the end of every shift one copy of this data is forwarded to a central D P processing point, one copy is forwarded to management's deputy responsible for that production process or unit, and one copy is retained for line supervision. After the collation of all the recording data, a summarised daily total production report, measuring deviations from budget for every section, unit and yield, is presented to management at 08h00 hours the following morning. Annexure 4 is an actual example of such a report. Perpetual inventory records of all units of inter-process work in progress and final stocks on hand are compiled automatically for each section of the plant and at the end of the last shift at the end of the calendar month - cut off points - these theoretical inventories are verified by means of random testing of mass and units. The monthly master production report - a balanced summary of all the daily total production reports - forms the basis for the monthly detailed and evaluated memorandum costfinding reporting of the organisation.

Summary

cf An illustration of the costfinding principles when applied to Overheads is given in Internal Control etc, op cit Appendix J (UNISA).

As any variances from the budget for all the operations can be seen at a glance, firstly for every function, secondly for every main group, and thirdly in total summarised form for the month, and cumulative for the period to date, corrective action becomes simplified.

Thus the principle of management by exception can be applied in its true sense, with a minimum time lapse, to investigate and ascertain the actual causes of cost distortion. In no circumstances whatever, can prognosed results be changed without special authorisation from the Board of Directors. This ensures SOURCE CONTROL OF THE PROGNOSIS.

COMPUTERISATION vs MECHANISATION

A SYNOPSIS OF THE FACTORS THAT LED TO THE FINAL DECISION

(pages 5 75 - 5 82)

CHAPTER V

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- 2 The urgent need to change quickly
- 3 The factors that influenced the final decision
 - i the cost involved
 - ii the time factor
 - iii the lack of local bureaux
 - iv the inherent obsolescence factor
 - v the speed and capacity of the hardware available
- 4 The factors that finally led to the acceptance of mechanisation on conventional accounting machines
 - i availability
 - ii price and finance
 - iii local after-sales service and maintenance
 - iv availability of trained operators and inhouse training facilities
 - v visible recording
- 5 The mechanisation programme
 - i immediate
 - ii in the near future

5 COMPUTERISATION AS MECHANISATION - A SYNOPSIS OF THE FACTORS THAT LED TO THE
FINAL DECISION

1 General

The assignment at this undertaking was not the normal one of selecting and installing a suitable yet economical means of mechanisation of an existing recording accounting and cost-accounting function.

In the usual assignment a sum of money is allocated by the management after a feasibility survey has been completed and alternative recommendations have been considered. Before the final decision is made management endeavours to evaluate the utility of the data that it feels is necessary, sets aside the relevant amount, and then the assignment may be proceeded with. This was not the case at Dunswart Iron and Steel Works, Limited.

A scientific and successful mechanisation presupposes some existing system to mechanise.

As this, in general, was not the case, an equitable, suitable, but basic accounting system had to be designed to satisfy the needs of a modern costfinding installation of management information, yet simultaneously to comply with the audit surveillance requirements by assisting the professional accountant in his task of ascertaining the reliability of the financial statements and of rendering his opinion on the fairness of the presentation of these statements.

All of this had to be accomplished at a reasonable cost.

A further factor that presented innumerable difficulties in the design and implementation of a suitable accounting system was the hostility and lack of co-operation of the majority of the senior and junior administrative staff who had been in the employ of the undertaking for many years. All thoughts of change distressed them and they resisted to the bitter end.

2 A synopsis of the factors that led to the final decision

That some form of streamlining and automation of the recording function was essential was indisputable, but serious problems arose as to what form and means this should take.

There was now a scientific plan of cost centre codes and plan of accounts to be the basis of all future recording. This would be the basis of the reporting and evaluating function that ultimately would culminate in costfinding. This in turn would embrace all shopfloor and plant production recording, perpetual inventories and the wages functions.

2 1 The urgent need to change quickly

2 1 1 Delays at the inception of a mechanisation could still be tolerated in all the aspects of the undertaking's operations with the exception of the compilation and payment of wages to some two thousand production and other daily paid employees. This pay compilation was at the time being manually effected by two labour-intensive wage offices, one for Europeans and one for Bantu.

As the feasibility survey progressed, staff panicked, the normal staff erosion process accelerated, and there was an imminent danger of collapse. It was thus essential that changes and mechanisation should be introduced with the utmost speed.

2 1 2 With the introduction of perpetual inventories for consumable stores and raw materials, requisitions had now to be signed for all materials and products issued throughout the plant. Authorised signatories had to be appointed for various levels of value. The requisitions had to be coded both as to the consumer department or cost centre and the part or commodity number for stores ledgers collation and collection. Inventories had to be verified, identified and valued and a catalogue compiled with relevant commodity codes or part number. Here too the time factor was of the utmost importance.

2 1 3 Cash books, ledgers, journals, control accounts and subsidiary ledgers had to be designed, acquired and implemented.

- 2 1 4 Detailed departmental and production budgets had to be compiled and instituted for all the phases of the undertaking's operations. Special attention had to be given to all aspects to promote the very necessary cost reduction campaign that was to be implemented with immediate effect. A vital necessity here was that actual results could be compared and contrasted with the relevant departmental and cost centre budgets. Untoward factors and adverse variances had to be disclosed so that the necessary remedial action could be taken. Once again time was of the essence.

Koontz H (1971) op cit, page 145 quotes Drucker P as saying so aptly many years ago that the best kind of control is SELF CONTROL. In other words that if the manager concerned knows the objectives he is expected to achieve and the plans he is responsible for accomplishing, and if he has the right kind of information that tells him how well he is doing, he will in most cases undertake corrections himself rather than wait for his boss to detect deviations and require corrections.

- 2 2 The factors with regard to computerisation that materially influenced the final decision can be briefly summarised as follows:

2 2 1 The cost involved

The cost of an inhouse computer was prohibitive to the undertaking at this stage. Further, the cost and the availability of the specialised staff necessary to operate such a computerised installation, and where to house it, were further determining factors.

2 2 2 The time factor

From the time of order it was estimated that it would take some ten months at the earliest for the computer suppliers to deliver the requisite machine with its software. From the time of delivery and installation a further two or three months would be required for the necessary programming. All in all, it would be at least a year before computerisation would become effective and, as previously demonstrated, time was of the essence with regard to the wages function in particular, and to the cost and profitability structure of the company in general. Action had to be taken immediately as the threat of imminent collapse was too great.

2 2 3 The lack of local Bureau or other time sharing facilities

In 1965 when this assignment reached its zenith and the urgent need of

computer facilities manifested itself, there were no other concerns in the area with which an agreement for computer facilities on a time-sharing basis could be entered into. The nearest Bureau was in Johannesburg, some forty kilometers away, and its current load precluded any Bureau work of the visualised magnitude.

2 2 4 The inherent obsolescence factor

In 1965 a factor which manifested itself very clearly was the danger of obsolescence. Due to the delay in the supply of a machine it often happened that between the time of placing the order and the delivery of the computer, technological science had advanced so fast that there were newer, faster and larger capacity hard-- and soft--ware becoming perfected and available. This was definitely not the time for an inhouse computer.

2 2 5 The speed and capacity of the hardware available

Here the old problem of computerisation dating back to its mechanical forerunners again manifested itself. The smaller range of machines available would not cope sufficiently with the undertaking's workload, and the larger of the range would result in the machine being USEFULLY occupied for less than half of the available time. And idle time in a cost intensive computer results in high cost operating time.

2 3 The factors in favour of mechanisation on conventional accounting machines that finally led to their acceptance and installation can be briefly summarised as follows:

2 3 1 Availability

Investigation revealed that the National Cash Register Company S.A. (Proprietary) Limited could supply practically immediately five NCR 33/26 class of conventional accounting machines together with five E461 Punch to Tape units. These could include the necessary visible index ledger trolleys as extras if required.

2 3 2 Price and Finance

The price quoted for these machines was very favourable indeed. At some R20 000 for the entire installation, NCR proved their eagerness to obtain the order, and their willingness to co-operate was proved in the financing that they offered, i e, on a five-year lease agreement with the option at the end of this period for ownership to pass at a nominal value. Annual service and maintenance contracts were to be entered into after the expiry of a

...../stipulated

stipulated guarantee and running-in period.

2 3 3 Local after-sales service and maintenance

A further very attractive feature of the proposed NCR installation was the fact that NCR had a local branch in Beoni which was fully equipped to carry out the necessary after-sales service and maintenance. This was offered by them on a guaranteed twenty-four hour basis which would include week-ends and public holidays.

2 3 4 Less stringent housing requirements of conventional accounting machines

The fact that conventional accounting machines necessitated less stringent housing and operating conditions would prove to be a great advantage to Dunsward Iron and Steel Works, Limited with practically no suitable office accommodation whatever. A computerised installation would require a separate office block of some sort that was both humidity controlled and air-conditioned with a suitable dust extraction plant. This would have proved to be a serious obstacle in view of the time factor, even had the necessary finances been available.

To accommodate the conventional accounting machine installation it was proposed to erect a temporary prefabricated office complex which would necessitate the minimum outlay of funds and at the same time provide office accommodation for a number of the additional administrative and clerical staff that would be necessitated by the installation of the costfinding and management information and reporting system envisaged.

As an emergency measure the NCR machines could be installed and operated in a part of an old existing stores building.

2 3 5 Availability of trained operators and inhouse training facilities

In 1965, before the large scale swing to the computer by the Commercial Banks and other concerns, there was no shortage of trained operators for conventional accounting machines. In fact to the many qualified operators that travelled daily to the larger surrounding towns and cities, the offer of suitable employment nearer to their places of residence was eagerly grasped even though there were dismal prospects of long hours of overtime. With conventional accounting machines there was also the great advantage of inhouse training after the suppliers of the machines had provided at no cost a two week basic training course at their training school in Johannesburg.

2 3 6 Visible recording

As all records are visible at all times and do not need to be processed and a printout

...../produced

produced before action can be taken; there was a further immediate advantage over computerisation in the prevailing circumstances. One which would be of inestimable value to the decision making and policy formulation function especially when an undertaking is in the process of a reorganisation and cost-reduction campaign.

2 3 7 An established NCR Computer Bureau in Johannesburg for processing of punched Tapes.

In Johannesburg NCR had a Bureau with a modern 315 Computer together with guaranteed back-up service facilities on a national basis. This Bureau would process the punched tapes produced as a by-product of the day-to-day operation of the conventional NCR accounting machines. NCR were prepared to guarantee the availability of this service on a twenty-four hour basis and the Bureau facilities would be provided at a reduced rate, i.e., on a marginal cost basis. All of this would be a concession dependent upon whether NCR conventional accounting machines were acquired by the undertaking. This feature was very attractive indeed as it bridged the gap between the present conventional accounting machine requirements and that of the future with full computerisation when the time came for this.

2 3 8 The mechanisation programme

The proposed utilisation of the five machines to be acquired was in two phases:

- i Immediate
- ii In the near future

- a Immediate

Priority was to be given to the mechanisation of the wages function and on the two days preceding the payout all five machines were to concentrate on the recording and compilation of a payroll which would still in the main be dependent on a manual compilation based on clock-cards. This would continue only as long it took to find a suitable Bureau so that a computerised system of wages could be instituted. The object here was that ultimately the clockcards could be transmitted to the Bureau and that the processing of the payroll together with all the statistical data for control purposes could be compiled and computed.

It was not the intention to install data capturing units for this purpose at the undertaking. The Bureau would capture data direct from the clockcards by means of 80 field punch cards. All verification would also be done by the Bureau. Spare machine capacity of the NCR units would be used for:

- i Mechanised ledgers - and stores general
- ii Debtors and creditors
- iii Cash books with cheque writing and simultaneous posting of cashbooks and general ledger
- iv Stores issues and perpetual inventory records
- v Journal posting and cost distribution
- vi Compiling monthly age analysis schedules, cost centre analyses and general ledger trial balances.

b In the near future

Immediately these machines were no longer required for payroll functions the E461 Punch tape recorders would be incorporated for detailed accumulations of stores and raw materials issues and for other statistical analyses. It was estimated that there would then be sufficient machine capacity to cope with all the other mechanisation requirements of the undertaking as a whole.

2 3 Conclusion

In view of the factors enumerated above the only action that could be taken was to order the conventional machine accounting installation which, with the exception of the complete computerisation of the wages function and with the acquisition of two further NCR 32/21 machines to cope with the progress of the undertaking, is still in use today.

SPECIFIC APPLICATION -

AN EMPIRICAL REVIEW OF COSTFINDING IN ACTION

(pages 6 83 - 6 117)

CHAPTER VI

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6 SPECIFIC APPLICATION - AN EMPIRICAL REVIEW OF COSTFINDING IN ACTION

1 General

As stated in Chapter 4 the costfinding - management information and control system installed at Dunsward Iron and Steel Works, Limited consists of three functions or aspects viz:

- i The evaluating and reporting function
- ii The control function
- iii The recording function

It was stressed that it was essential for the successful operation of costfinding that these three aspects were to function as a completely inter-dependent and inseparable whole from which the static and dynamic aspects of management control could flow in order to promote scientific management of the spectrum.

In the preceding chapters the theoretical aspects of costfinding have been clearly set out, and now in this chapter specific applications will be illustrated in the form of an empirical review of costfinding in action in Dunsward Iron and Steel Works, Limited.

Three examples of both the static and dynamic aspects of costfinding in action will be reviewed. In each case these are extracted from the actual application installed at the undertaking in 1965 and still in force.

In the review that follows the management control that is inherent in costfinding is demonstrated in two phases i e,

- i The static aspect
- ii The dynamic aspect

2 Static management control

2.1 The stores function - an abridged sectional review

2.1.1 Organisational structure

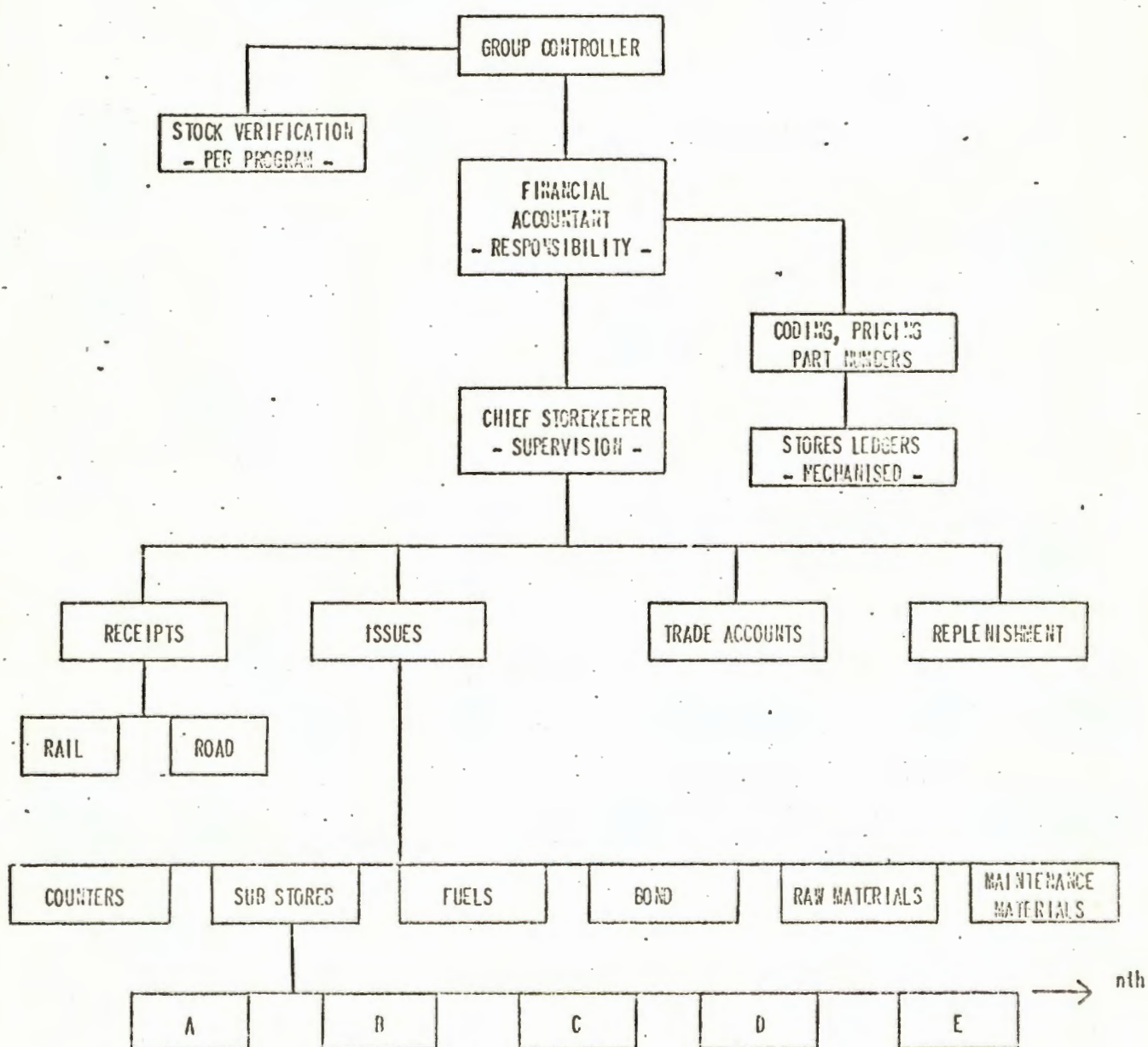
The Stores function is directly responsible to the Financial Accountant

...../who

who ultimately reports to the Group Controller on the scalar chain of command.

DIAGRAMMATICALLY DEPICTED:

EXPLODED SECTIONAL ORGANISATION CHART



2 1 2 Stores codification and part number catalogue

Every item that is encompassed within the Stores safeguarding and protecting function is identified by a commodity code number. These commodity code numbers identify all commodities from the time of the purchase order requisition to their ultimate usage. Annexure 5 is an illustration of the index to the bound Stores catalogues in general use.

2 1 3 The basis of inventory valuation of issues to Production, auxiliary, service and other departments

Issues from Stores are based on a running average cost that is compiled and listed automatically as a programmed -visible by-product- machine operation when the mechanised inventory cards for every commodity have movements recorded - see annexure 6.

2 1 4 Re-order levels

- i The issues from each commodity inventory card are automatically accumulated in a separate column on that card. This operation is a programmed -by-product- which is incorporated in the C D V (code digit verification) proof of the accuracy of the posting to the commodity card
 - cf The -twin stream- flow of the built-in control in these two types of operations reveals clearly the everpresent, dual, automatic, and near basic control inherent in all recording of transactions throughout the entire costfinding system. - THE SPECIFIC AUTOMATIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL.
- ii This automatic accumulation of the total issues of each commodity acts as an automatic check on the maximum, minimum and re-order levels that are -flagged- on every card. Thus the human element is practically eliminated in the constant re-assessment, revision, and updating of these re-order levels to ensure that they remain realistic, logical and practical from the viewpoint of both meeting the normal issue requirements and reducing to a minimum the working capital outlay in inventories
 - cf The utter necessity of this control is appreciated when it is realised that the inventory value of raw materials and consumable goods - excluding semi and finished products - is in the neighbourhood of some seven million rand at any given time.
- iii This automatic visible accumulation of the issues on commodity cards has a further advantage conducive to efficient and economic Stores operation in that it constantly

...../updates

updates re-order levels and equates these levels to current usage levels in order to PROMOTE THE OPTIMUM UTILISATION OF THE PRODUCTION FACILITIES AT ANY GIVEN LEVEL OF PRODUCTION. Thus is facilitated the identification and the removal of surplus and obsolete inventory. A specific procedure is applicable to slow moving inventory which is classified as -insurance spares- viz:

Insurance spares and replacement parts

In a Steel Works with its multi-million investments in highly specialised single purpose plant a comprehensive range of spares and replacement parts must be available at all times in case of emergencies such as breakdowns. The very nature of highly specialised single purpose imported plant makes the stocking of a full and comprehensive range of parts essential even though the possibility exists that such parts will never be required. In the majority of cases plant is acquired from foreign manufacturers and is specially designed on a once-off basis. For such a supplier to manufacture and supply spare parts in case of plant breakdowns in later years, can often involve a considerable period of time. Thereafter the problem of high cost transport by air to shorten the -down time- in a section of continuous operation plant must be faced. In many instances the size and the mass of the parts in question prohibit air transport altogether and then the further unavoidable delay of sea transport must be faced. Seen in the light that in massive, basic, plant-intensive undertakings such as this Steel Works, the greater part of the cost structure is of a fixed nature, it becomes only too clear why extensive non-productive time caused by breakdowns must be avoided at ALL costs.

And thus is born the policy of -insurance- spares: a policy of -stockpiling- parts and spares with every expansion scheme which, in the opinion of the engineers who supply, erect and commission the new plant, and management, are difficult to obtain at short notice, and thus should be carried in stock.

To sum up, -insurance spares- are a predetermined range of emergency spare and replacement parts ordered simultaneously with an expansion scheme. This range of spares and parts, quite often in excess of half a million rand, is considered to be -insurance- parts and taken up in the consumable stores mechanised ledgers - insurance in the sense of insurance against long-term breakdowns with consequent loss of production. Stoppages can occur that in extreme cases can cripple the entire production process. The cost of acquiring, holding and safe-guarding such spares is an intangible -insurance- cost. Costfinding principles now dictate that it is not equitable to levy depreciation on this type of inventory by the normal method. Therefore an Obsolescence provision is written up on a normal surcharge or tariff basis to provide for the eventual write off of these -insurance- parts and spares.

of A PROVISION in the strict sense of the 8th schedule to the Company's Act of 1926 as amended.

In ALL instances when plant is retired, scrapped or disposed of, ALL spares and parts, relevant thereto, are written off simultaneously.

2 1 5 The receiving aspect of the custodianship function

In a plant covering in extent an area of approximately 20 hectares, the importance of the smooth operation of the custodianship function as a segment in the cycle of control can never be sufficiently stressed. This segment in turn is divided into subsegments and sub-subsegments, all designed to further specifically, within each division and subdivision, the automatic operation of the basic -twin- flow of near automatic control - clear segregation and a complete divorce of the recording and custodian functions.

Annexure 7 illustrates the actual procedure for the receipt of supplies.

At Dunswart Iron and Steel Works, Limited there is one central store and numerous sub-stores located at strategic places to cater for the flow requirements of the production process. Bulky raw materials of high mass feeding the melting furnaces are contained in sub-stores located nearest the point of usage, and are fed by continuous conveyor belts into the massive -baskets- which in turn feed the furnaces. The control point here is the -baskets-, which, when lifted, an automatic -tared- weighing device in the overhead cranes records the input mass. Each record card is numerically numbered and constitutes the basis of shopfloor recording and the production control function relevant to raw materials.

The cardinal rule with regards the Stores or custodianship function is that no goods from outside suppliers can enter the plant without passing, and being accepted, through the main stores, either physically or by the -long hand-. For obvious reasons this is a further very strong link in the chain of automatic and near basic control.

2 1 6 The issuing aspect of the custodianship function - the twin streams of control inherent in the spectrum

- 1 Here the cardinal rule is that in no circumstances whatever may any materials or goods leave the stores without the presentation of a numbered set of requisitions, in duplicate, signed by an authorised signatory.
- 2 It is in this aspect of the custodianship function that the action and inter-action, relationship and inter-relationship in all segments, sub-segments and fractions of the dual or twin streams of basic and near automatic control, inherent in the spectrum, become most apparent - the dynamic twin sets of circumstances symbolic of the entire costfinding application in the undertaking.
- 3 As previously stated, raw materials and goods, may only be issued from the stores

...../on

on receipt of a duly signed requisition, in duplicate. The signing powers of requisitioners are delegated by top management to line management much on the basis of the cheque signatory regulations of banks, viz:

- i There is a schedule showing those authorised to sign requisitions together with specimen signatures - refer annexure 8.
- ii There is a maximum value at every given level of the scalar chain of authority that may be issued to any recipient.
A chargehand may authorise issues up to R50. A foreman may authorise issues up to R100 and so on up the scalar chain to top management.
- iii The authorised signatory signs after the requisition has been completed and the following information inserted -
 - a The reason for drawing the item
 - b The cost centre and account code to be debited
 - c The date
 - d The quantity or mass requisitioned
 - e The description
- iv All requisitions are on a one-off only basis, i e, one item per requisition.
- v All requisitions are numbered, are in pad form, and are in triplicate. The original is white, the first copy pink and the second - the bound book copy - is green.
- vi The issuing storeman ensures that the requisition is properly completed and signed, and is in duplicate, before the issue called for is made. On issue the requisitions are numbered by the numbering machine in the relevant stores.
This is the numerical control that identified the issue of the materials of goods through the recording process and ultimately is the posting media reference in the mechanised stores ledgers.
- vii The distribution flow of the requisitions after issue is in itself a further dual or twin flow of control. The first copies - pink - are sorted together daily per function and distribution to the head of the cost centre WHICH HAS BEEN CHARGED with the issue. These are NOT returned to the recipient's department i e, the authorised signatory UNLESS the cost centre charged is that of the recipient's. The functional head of the cost centre or service centre charged daily scrutinises the pink copies of all the requisitions that have been charged to that cost centre, and, if he approves, he destroys them. Should he not approve he takes up the matter with the authority drawing the material. In the case of dispute the matter can be referred to management. Thus within twenty-four hours at the latest the second part of the twin or dual aspects of control has been exercised at a MINIMAL COST.

Finally, in concluding this review of the Stores function in the undertaking, it must be pointed out that this has been but a very abridged review of SOME of the salient aspects of the twin or dual flow of near basic and automatic control inherent in this costfinding installation. But, we submit, in closing this section, that the Stores function and its efficient operation, often the very underrated orphan of the large works, will now be seen in a new light.

2 2 Wages - the management control inherent in all the phases of the recording, compilation and payout function

2 2 1 General

Wages - a small word - but a word with an immeasurable potential for misdemeanour and mismanagement, especially when viewed in the light of the contemporary exigencies of the sententious seventies with its emergent giants of industry. Today the large scale production complexes have monthly wage bills of fantastic proportion - the undertaking under review, a Steel Works, have an average monthly commitment of some R500 000 to employees ranging from skilled and semi-skilled Europeans to illiterate Bantu labourers. No longer are the large scale employers of labour faced only with the problems of a decade ago - that of defalcation - but the complexities of the problems of control have literally increased in a geometric progression in depth, extent and scale. Two hitherto unknown aspects that profoundly effect the cost structure of an undertaking now manifest themselves:-

i The vital necessity of controlling the productivity and incidence of labour

The importance of this, especially when seen in the prevailing acute shortage of labour, is more appreciated when it is realised that any adverse factor is multiplied many thousands of times in a large scale production unit. Often it is the difference between success or failure for an undertaking.

ii The equally acute shortage of cost intensive clerical labour

Coupled with the above has come the advent of the -time thieves- with a consequent impact upon the entire cost AND production structure of such a serious nature that it must, at all costs, be limited to reasonable proportions, though, it is submitted, it can never be completely eliminated.

cf The fallacious recording for payment purposes of normal and overtime hours that are not worked. As an example it be be quoted the in Dunswart Iron and Steel Works, Limited a test period has revealed a potential of 10 000 hours at a average cost of R2,00 in a cost period of one month. THIS ESTIMATED R20 000 IS BUT A SMALL FACTOR WHEN COMPARED WITH THE POTENTIAL COST OF THE RESULTANT PRODUCTION -DRAG- WHEN SEEN IN THE LIGHT OF THE FIXED AND SEMI VARIABLE COSTS OF A MULTI-MILLION RAND FIXED ASSET ORGANISATION.

Thus in one decade additional management problems have appeared, problem patterns have intensified, and simultaneously, other adverse factors have appeared that seriously hamper and limit the means to solve these problems, and anything that handicaps the control potential MUST SPELL SERIOUS TROUBLE AND BE AVOIDED AT ALL TIMES.

The need for an express management information system disclosing only CURRENT untoward factors for immediate or prognostic remedial action and yet at all times to be a silent but everpresent watchdog, is now, more than ever before, a basic requirement for scientific management of the wages function.

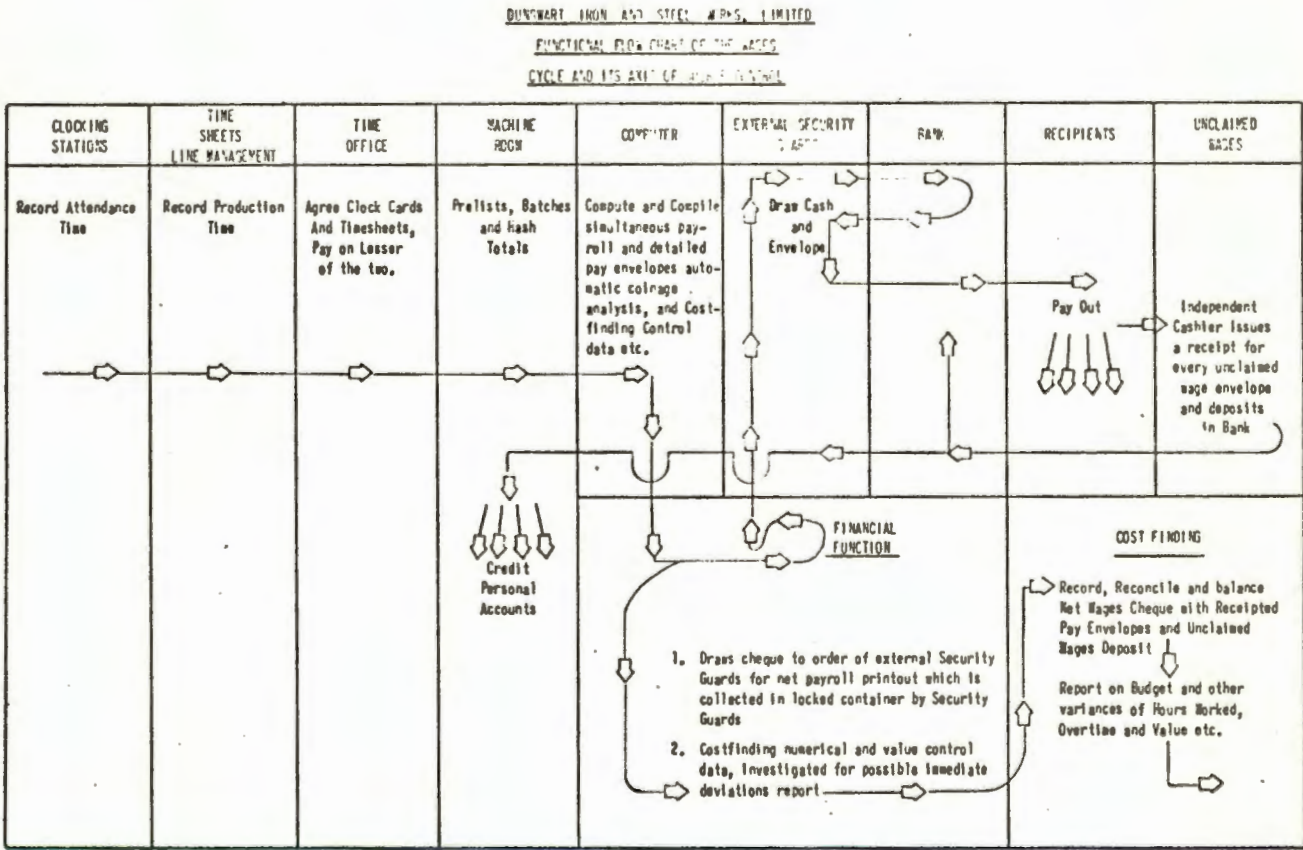
cf A further demonstration of the importance of the role that the wages function plays in modern industry is the fact that the wages element of total manufacturing cost at Dunswart Iron and Steel Works, Limited in May, 1973 was 12,1%.

The foregoing has now briefly presented some of the aspects of the contemporary problems to be guarded against in the wages function of large scale enterprises. And, it is submitted, it has highlighted that the wages function of yesteryear, bears little resemblance to the streamlined department of the strategic express reporting costfinding function that it forms part of today. The emphasis on the basic objectives of control of the wages function has shifted beyond the wildest dreams of the professional man of a decade ago.

But the often forgotten fact that -we must crawl before we can walk- holds as good here as in any other installation. The presence of near basic and automatic control is an ABSOLUTE REQUISITE before the express reporting aspect of dynamic control can come into operation, and we therefore firstly review the near basic and automatic aspects of the costfinding controls in the undertaking, and thereafter, based on this, some -live- applications of the dynamic aspects of the modern management controls that emanate from the static.

2 2 2 Basic and near automatic control - the basis of all wages procedures

All procedures are, in every respect, based on the principle of the complete divorce or segregation of the functions of transacting, recording and custodianship, with control at the source, and on an instantly identifiable trail as the axis that all revolves on, as depicted by the functional flow chart of the wages cycle and its axis of control.



There are independent departments responsible for the various facets of:-

- i Engagement of personnel
- ii Dismissal of personnel

- iii Recording of attendance: time clocks: timesheets
- iv Compilation of data for the computation of wages etc,
- v Originating and drawing of wages cheques
- vi Cashing the cheques and the enveloping of earnings - all of which are balanced back to the net amount of the payroll prior to the commencement of any pay parades.
- vii Pay parades: conducted at set times and at given points in works to obviate idle time
- viii Pay parades identification: company identification photo and cards are issued to European personnel when they are engaged; Bantu employees receive armbands with their clock numbers on and their area of employment denoted by a colour code
- ix Unclaimed wages: depositing and receipting of these are effected on the same day as the payout; rebanking of cash; personal accounts; identification before paying claims for unclaimed wages
- x Control accounts: in respect of all deductions and earnings
- xi Source control statistics: functional labour complement and utilisation of ordinary time and overtime hours worked; ordinary and overtime pay; overtime premium
- xii Comparison of hours worked and earnings with budgets; highlighting variances in monthly management reports or immediate untoward factors reports
- xiii Computerised European and Bantu payrolls; complete records of each week's payrolls; storing and printing out weekly cumulative earnings; effecting deductions and accruing leave shifts per employee
- xiv Ensuring that unauthorised increases cannot be effected: duly authorised basic data amendment advices to the computer are accepted only from the Personnel department or Bantu Liaison Officer
- xv Ensuring that there is an automatic transfer to separate memory of basic and accumulated data when discharge advice given to computer and that all data is stored for the duration of the fiscal year; I R P 5 certificates printed; accumulated earnings and deductions cleared; basic data re discharged personnel cleared; basic data re remaining personnel retained for new year; that the total P A Y E reflected on the I R P 5 certificates are balanced back to the total of the tax deductions for the period and in turn that these are agreed with the monthly payments to the Receiver of Revenue.

Interwoven in every phase of the transacting, recording and custodianship functions, are basic built-in automatic divisions and sub-divisions of the twin or dual streams of control that are either negative or positive, real or psychological. All of these form part of the submerged rails that the basic and near automatic control runs on passing the -stations- and -intersections- where dynamic management controls originate and result in the express reporting of untoward factors that culminates in scientific management policy decisions and allows the appropriate remedial action at the source. To ensure constant adherence to these set procedures and methods, and to obviate the possible by-passing of responsible officers on the scalar chain of command, a manual of procedures, responsibilities and methods appertaining to the wages Function has been compiled and is OPERATIVE AT ALL TIMES. There is no costly internal audit of yesteryear to ensure compliance with the manual, but due to the costfinding principles of control that forms the basis of all the procedures each function automatically -vouches- the correctness of the preceding function. This manual details each section's duties and sets out a time schedule for all actions. It consists of several hundred pages, and therefore it would not be practical to reproduce. Instead, as a compromise, and to give an indication of its contents, the index only is attached to this thesis - refer annexure 9.

To give but a brief review of the extent and depth of the coverage of the division of the responsibilities of all aspects of the wages function, an extract is given hereunder of Section 2 1 - 2 2 and 2 3 -f Section 2 - General.

Extract

2 General

2 1 The division of RESPONSIBILITIES is as follows:-

2 1 1 Departmental Heads - Line Management

- a Advising personnel requirements;
- b completing European engagement advices after appointment,
- c advising of personnel transfers;
- d recommendations - rates of pay;
- e advising of resignations/dismissals;
- f approval of leave applications;
- g reporting all injuries sustained by personnel;
- h daily timesheets;
- i issuing works exeat notes;
- j obtaining medical certificates;
- k compliance with hard hat requirements.

2 1 2 Personnel Department and Bantu Liaison Officer

- a recruiting;
- b engagements;
- c fixing rates of pay and obtaining managerial authority/approval;
- d contracts of services;
- e ensuring that new employees are medically examined;
- f processing preliminary personal records;
- g originating computer basic data and amendment advices;
- h ensuring compliances with statutory regulations;
- i ensuring compliance with hard hat requirements.

2 1 3 The Time Office

- a checking basic data and amendment advices;
- b timekeeping and processing of data for payrolls of hourly paid personnel;

- c allocation of European clock numbers and general clock number control;
- d mechanical preparation of new clock cards (Security Department provides all the required addressograph plates);
- e distribution of hours - workshops;
- f preparation of statutory wage/personnel statistics;
- g compilation of budget statistics;
- h weekly/monthly payments - deduction and/or company contribution creditors (P A Y E, D I S W Medical Aid Soceity and Pension Fund excluded);
- i preparation of payroll summaries;
- j ensuring compliance with statutory regulations;
- k recovery of wages prepaid during week;
- l authorising payments of unclaimed wages.

2 1 4 Security Department - Internal

- a making of all addressograph plates required for clock cards (no other department shall be permitted to do so);
- b providing employees with identification media;
- c supervising mechanical recording of attendance (Clocking Stations);
- d instigating remedial action re malfunctioning of clocking equipment;
- e observing payroll cash - enveloping and attending pay parades;
- f checking and depositing of wage refunds;
- g depositing unclaimed wages;
- h recording of time on Works Exeat Notes.

2 1 5 Cashier - Revenue

- a checking, receipting and banking of wage refunds and unclaimed wages;
- b transmitting originals or receipts to Chief Timekeeper;
- c attaching copies of receipts to received funds voucher;
- d transmitting received funds voucher to Financial Accounting Section.

2 1 6 Cashier - Expenditure

- a checking of personal accounts prior to making any payments;
- b payment of prepaid and unclaimed wages;
- c recording all transactions;
- d preparation of posting media for personal accounts;
- e payment of Bantu Salaries.

2 1 7 Machine Centre

Effecting personal accounts posting - debit payment per Cashier's posting media and credit per copies of receipts attached to received funds voucher.

2 2 Managerial authority - engagements/rates of pay

2 2 1 Authority to engage an employee to fill an existing vacant position is tacit.

2 2 2 Specific managerial authority is required for the engagement of an employee in a newly created position.

2 2 3 Rates of pay are at all times subject to specific managerial approval.

2 2 4 As regards Bantu, it is the practice for management to authorise:-

- a a standardised wage rate structure which conforms to wage regulating measures in force from time to time
- b any changes in the existing labour allocation
- c the Bantu Liaison Officer to approve wage rates and engagement of personnel within the framework of (b) above, and to refer for specific approval of management only such matters as may fall outside the scope of the standardised wage rates and labour allocations.

2 3 Reference

Reference used herein shall mean the following:-

2 3 1 -Industrial Conciliation Act- -

The Industrial Conciliation Act, 1956 as amended - Main Agreement for the Iron, Steel, Engineering and Metallurgical Industry (which includes the I S P A sub-group Agreement) per Government Gazette extra-ordinary no. 2046 dated 19th April, 1968.

2 3 2 -Sick Pay Fund-- -

The Industrial Conciliation Act, 1956 as amended - Sick Pay Fund Agreement for the Iron, Steel, Engineering and Metallurgical Industry per Government Gazette no. 2692 dated 24th April, 1970.

2 3 3 -Provident Fund- -

The Industrial Conciliation Act, 1956 as amended - Metal Industries Group Life and Provident Agreement of which the provisions are extended in terms of notice published in Government Gazette No. 2713 dated 22nd May, 1970.

2 3 4 -Workmen's Compensation- -

The Workmen's Compensation Act, 1941 as amended.

2 3 5 -Factories Act- -

Factories, Machinery and Building Works Act, as amended.

2 3 6 -Pension Fund- -

Dunswart Iron and Steel Works, Limited Pension and Life Assurance Scheme, registered by the African Life Assurance Society Limited with the Secretary for Inland Revenue and Registrar of Pension Funds.

2 3 Specific illustrations of the twin or dual streams of control that protects and safe-guards

In this section we have now briefly reviewed the static management controls that are inherent in the stores and wages functions. But before we leave these basic and near automatic aspects of control and proceed to discuss some of the phases of the dynamic control that is made possible by the successful operation of these static controls, let us demonstrate how this static control permeates into the components and segments of a function such as wages.

To demonstrate the constant automatic duality of the operation of these static controls we will now review empirically the actual operation of five of the aspects of the wages function to demonstrate Bantu wage control and one of the aspects of perpetual inventory control.

2 3 1 Armbands - incorporating safety hats

Here is an example of the duality of static control that is not only positive and negative but is also real and psychological. But in the inception a brief explanation for this very unusual combination of safety regulation enforcement in the wages function is necessary. In the Steel Works in question it

...../was

was found that employees were prone to head injuries due to the nature of the production process. Safety hats were introduced and the wearing of these at all times were made compulsory. The enforcement of this regulation proved to be very difficult indeed as Bantu employees in particular were averse to wearing such apparel. Even the threat of severe disciplinary measures could not induce these employees to comply with the safety regulation that were instigated to safeguard and protect the employee as well as the company. To obviate the application of the severe disciplinary measures mentioned above which could only result in worsening an already high labour turnover or alternatively to cause labour unrest, another solution had to be found. And the elasticity and adaptability of the dual control that is propounded in this thesis is demonstrated. This control measure consists of a numerical and colour code combination where the colour code applicable to the armband applies to the safety hat as well. The payroll number of the plastic non-removable armband is the identity number given to the Bantu on his engagement and identifies him with the area - function - that he is employed in. The hard hat issued to the employee also identifies him by its colour to his area or function. Similarly the payroll number identifies the Bantu to his area - function - as well.

To illustrate the adaptability and flexibility of basic and near automatic control, and how its dual streams are applied to permeate automatically and constantly to all phases of an operation to allow control at the source, it will now be demonstrated as an example how the wearing of safety hats were enforced as one of the automatic by-products of other minor controls. These other minor controls being, inter alia,:

- i Area colour controls which reveals immediately by contrast when an employee is in an area other than where he should be.
- ii Ensuring that employees treated their safety hats with care, not losing nor temporarily exchanging or borrowing safety hats in a pay queue just in order to receive remuneration.

Therefore to demonstrate the actual application of the principles enumerated above as applied in the undertaking, we tabulate hereunder the actual procedure in force at present:

	Area	Area Colour	Existing Nos.	Emergency Nos.
1	Scrap Yard	Green	1 - 150	3001 - 3250
2	Furnaces	Red	151 - 600	3251 - 3550
3	Mills	Orange	601 - 1000	3551 - 3750
4	Despatch	Orange	1001 - 1200	3751 - 4000
5	Continuous Casting Plant	White	3251 - 3550	4001 - 4150
6	Sponge Iron Plant	Blue		4251 - 4550

9	Engineering			
9 1	Blacksmiths	Yellow	1701 - 1750	4501 - 4750
9 2	Boilermakers	Yellow	1751 - 1810	4751 - 5000
9 3	Bricklayers	Yellow	1811 - 1900	5001 - 5250
9 4	Carpenters	Yellow	1901 - 1950	5251 - 5500
9 5	Electricians	Yellow	1951 - 2050	5501 - 5750
9 6	Fitters	Yellow	2051 - 2150	5750 - 6000
9 7	Gas Plant	Yellow	2151 - 2200	6001 - 6250
9 8	Transport	Yellow	2201 - 2250	6251 - 6500
10	Compound	Grey	2251 - 2400	9000 - 9250
11	Outside Contractors	Purple		

NOTES:

- 1 In no circumstances whatever is a clock number to be issued to more than one employee in any one fiscal year.
- 2 This notice supersedes and replaces the existing schedule of Bantu clock number and emergency extensions introduced on 25th January, 1968.
- 3 At present the Continuous Casting Plant and Furnace Bantu are issued with clock numbers from the same series.

This will be rectified shortly when the emergency number series of 4001 - 4150 will be introduced.

To illustrate how the enforcement of the safety or hard hat procedures was accomplished an extract of the manual of procedure, responsibilities and methods of the wages function - page 17 and 18 section 2 17 is quoted hereunder:-

2 17 Safety helmets - hard hats

- 2 17 1 No person is permitted to enter or be in the works for any reason whatever without a safety helmet. Works Security will enforce this rule rigidly.
- 2 17 2 Each employee is, upon engagement, provided with a hard hat which, by colour, identifies his area of employment - function.
- 2 17 3 The employee must immediately report the loss of his hat in order that he be issued with another at his own expense.
- 2 17 4 The Head of Department/Bantu Liaison Officer must, when he issues such a replacement hat, immediately advise the Time Office thereof in writing for the deduction of the cost of the replacement from the employee's earnings. The cost may vary as the company considers equitable.
- 2 17 5 Upon termination of his services the employee must return his hard hat. The receiving official will provide the employee with a clearance note which the employee in turn must hand in at the Time Office.
- 2 17 6 In every instance where an employee fails to produce this hard hat clearance note, the Time Office will deduct the cost of replacement from the emoluments due for payment. If, however, the employee thereafter produces the clearance note, the Chief Timekeeper may authorise a refund of the amount so withheld, for payment to the employee out of petty cash.

From the foregoing it is now quite clear the all Bantu employees must at all times be in possession of, and wear, an armband and a safety - hard - hat. Both of which, numerically and by colour, identify him by his payroll - company - number - and by his area - function - of employment. UNLESS HE IS SO ATTIRED HE CANNOT RECEIVE HIS WEEKLY EMOLUMENTS.

Now for any system of internal or management control to comply with our definition of scientific near automatic and basic control there must automatically follow the other part of the dual or twin stream of control. The aspect that continuously ensures that there is full compliance with the procedures laid down at all times. In this instance adherence to the set procedures is effected by a physical verification every Friday morning as part of the pay procedures when employees queue to receive their remuneration. This is done as follows:

- i Each pay queue has two check points, each with a senior Bantu internal security guard and a senior compound Bantu clerk.
- ii At the first point the Bantu presenting himself for payment is identified by the Bantu Compound clerk. The Bantu internal security guard ascertains that the company number on the safety hat and on the employee's armband is the same. He then call the employee's company number to an external security guard who presents the employee with a detailed computerised earnings advice. The employee then -stupas- i.e, thumbprints this earnings advice as knowledge of his earnings, and at another point exchanges this receipted earnings advice for his computerised pay packet - envelope - which contains the money due to him. And the payment cycle for that Bantu employee is complete.

The automatic and near basic control cycle of the wages function is now complete, and the normal safeguarding and protecting objectives have been achieved. But as by-products of the successful operation of this automatic and near basic source control there has emerged further aspects of the automatic control that distinguishes the management control propounded in this thesis from contemporary internal control. These further aspects being that:

- i Unauthorised Bantu in the Works can immediately be identified and arrested.
- ii The colour code on the hard hat visually identifies Bantu in an area other than where they are employed.
- iii Head intensive accidents in the Steel Industry are minimised.

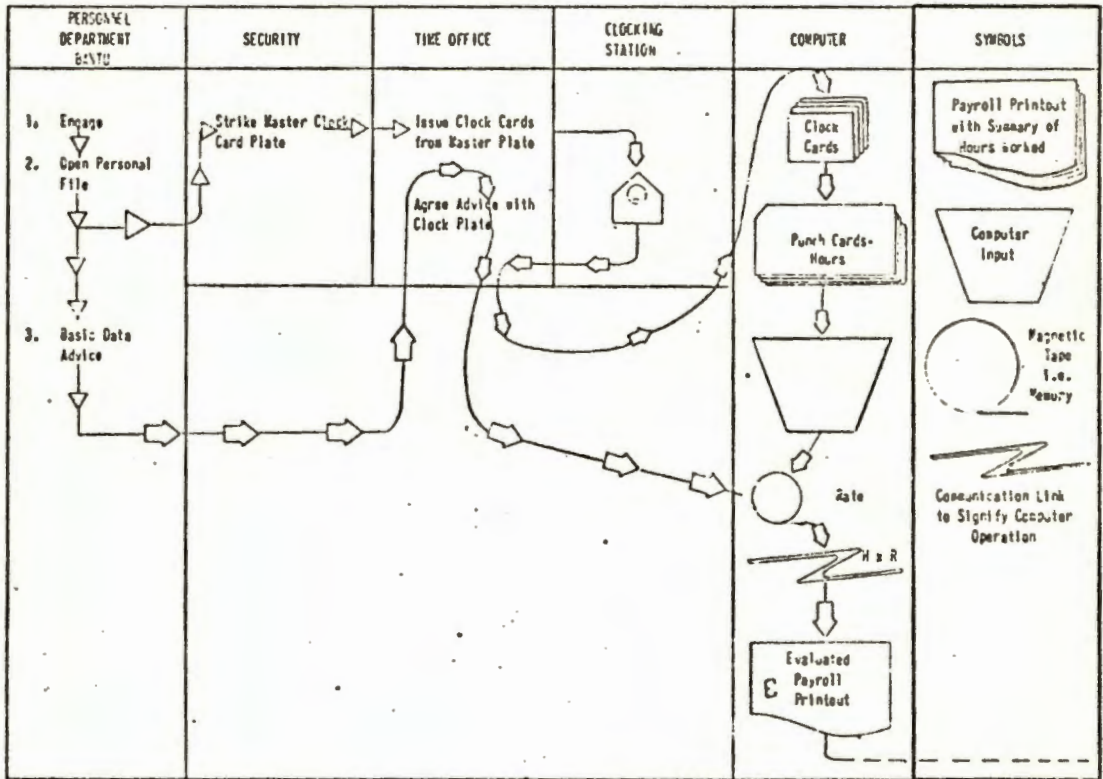
2 3 2 Addressograph plates and the twin streams of control that apply to employees hourly wage rates

Basic and near automatic control commences at the very beginning of the -line- management regularly sets a standard wage rate structure that conforms to the ruling wage regulations and this rate structure evaluated on a numerical basis is the basis of the master labour budget. This evaluated master budget determines not only the total strength of the undertaking but also the distribution thereof to the various sections of the Plant. The current budget wage rates, the budgeted number of employees, and the budgeted normal and overtime hours are the basis of the personnel strength. There was NO unauthorised deviations tolerated. Weekly, functional and total budget, actual, and deviations from the set norm are automatic AND simultaneous by-products of the computerised wage compilations AND are circulated directly to functional departmental heads, costfinding, and to management.

Thus, even before the recruitment of labour, the dual streams of control are already active. And it is in this light that this section should now be read as it is merely intended to demonstrate the depth of the automatic penetration of control to all fragments of the spectrum. In this case to employee wage rates as depicted in the flow diagram of the twin aspects of control for employee wage rates hereunder.

DUNSWART IRON AND STEEL WORKS, LIMITED

FLOW DIAGRAM OF THE TWIN ASPECTS OF CONTROL FOR EMPLOYEE WAGE RATES



2 3 3 Attendance time vs worked time

i The problem

In many instances time recorded at the clocking stations were paid for but NEVER WORKED.

Employees clock in and then left the premises with the shift going off duty that they were to take over from. In other cases employees had another job elsewhere; often only a few hours were worked and then the employees left. If employees were late they could clock off and OVERTIME RATES WERE AUTOMATICALLY APPLIED AND PAID FOR.

ii The solution - not just single but twin streams of control

Group timesheets per function for -worked- time were introduced - AUTHORISED AT THE SOURCE. Each functional departmental head submitting these timesheets direct

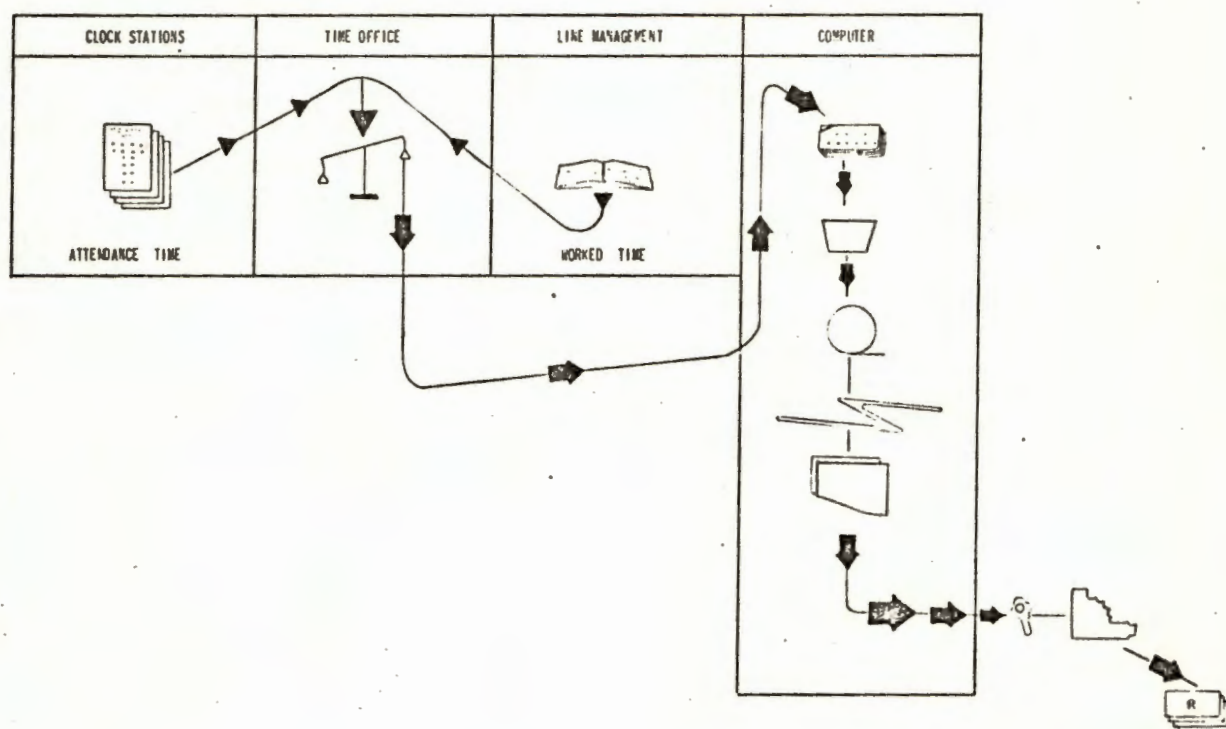
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to the time office.

The time office then compare and contrast these timesheets with the individual clock cards AND THE PAY IS THEN BASED ON THE LESSER OF THE TWO. Refer flow diagram.

DINSWART IRON AND STEEL WORKS, LIMITED

PICTORIAL FLOW DIAGRAM OF THE RECONCILIATION BETWEEN ATTENDANCE TIME - CLOCK CARDS -
AND PRODUCTION TIME - TIME SHEETS



This resulted in automatic and near basic source control via the dual streams of control.

In conclusion we extract hereunder the relevant section appertaining to time sheets per page

12 of the manual viz:-

2 13 Daily timesheets

2 13 1 Each head of department or his deputy must daily submit to the time office a timesheet in respect of all the hourly paid personnel employed in his section, reflecting the hours for payment as worked the previous day by each employee and the cost centre/account codes to which the time must be charged.

NOTE: Where personnel were not present, reflect:-

- i Employee's clock number and name
- ii Hours of absence
- iii Reason(s) for absence (enter in column where code is normally entered) viz:-

A/L = Annual Leave
 D/O = Day off, e g, Melt Shop Personnel
 O/P = Off with permission (No payment will be made for temporary absence unless an approved Works Exeat Note is submitted to the Time Office)
 ABS = Off without permission
 IOD = Off due to works accident (must be reported)
 ILL = Off ill (Medical certificate required)
 M/T = Off for Military Training

2 13 2 In no circumstances must hours for payment (i e, where a code is given against the time) be entered for any period that an employee was not actually on duty.

2 3 4 Recording attendance time - the clocking function

i The problem

With an hourly paid staff of some 2 000 it was found that the recording of attendance time in the usual manner offered a wide and considerable scope for the -time thieves-. Manipulations was rife: the emphasis falling heaviest on -dummy- employees and cost intensive overtime. Attendance time was recorded by employees for one another. In some instances one employee would clock other employees on and off for a whole night shift. One employee even worked on a -commission- basis: his fee - a pro rata share of normal and overtime wages paid to employees he clocked on and off that either come late, went off early or who failed to attend. Where employees clocked on and THEN went to the changerooms to change, many production hours were lost in the process. Conversely when employees, on coming off shift, first showered and changed and then clocked off when LEAVING the relevant section of the plant that they were employed on, the scope for malpractice could best be left to the reader's imagination.

ii The solution

At the outset it must be stressed that with the institution of time sheets and the payment of earnings based on the LESSER OF THE TWO i e, attendance time and production time as discussed in 5(c) this problem eased considerably. But, once again, the answer was an extension of the control cycle. Firstly the flow was altered. The locations of clocking stations were changed so that employees entered the changerooms and then after changing entered their places of work through the clocking stations. Conversely after completion of their shifts employee entered

...../the

the clocking stations, were clocked off and then entered the changerooms. Thereafter leaving the company premises. The result of these changes were that all time spent in the changerooms were not at the company's expense.

cf A survey of the time spent in changerooms by employees revealed a decrease of some 15%!

Finally to obviate tampering with clock cards and to avoid other malpractices, independent clockers were employed to operate each clocking station. All clocking stations now reported directly to the Chief Security Officer of the company and clock attendants were SOLELY responsible for recording by mechanical time clock on all clock cards the hours of attendance of each hourly paid European and Bantu employee. Refer annexure 9. The procedure being that the employee calls his company number to the clock attendant at the clocking station, the clock attendant extracts the clock card from the rack, holds it up for the employee to see, clocks it and then places it into the requisite -out- or -in- rack as the case may be. IN NO CIRCUMSTANCES WHAT-EVER MAY AN EMPLOYEE HANDLY HIS CLOCK CARD.

In closing this section certain extracts of the wages function manual are quoted hereunder.

Section 2 12 Daily Recording page 10

2 12 3 Hourly paid personnel are required to clock in and out of work in terms of the Industrial Conciliation Act Main Agreement.

2 12 4 Each hourly paid employee must personally report to the clocking station to:

2 12 4 1 Identify himself

2 12 4 2 Have his hours of attendance recorded by clock, i e, at the commencement and again at completion of his normal duties.

Section 6 Clocking Stations page 32 and 33

The station attendants are responsible for recording, by time clock on clock cards, the hours of attendance of each hourly paid European and Bantu employee.

6 1 Each employee must personally report to the clocking station to have the attendant clock his card:-

6 1 1 When commencing his normal daily duties.

6 1 2 At the completion of his normal daily duties.

6 1 3 When he leaves and again returns from temporary absence in the course of his normal duties, having obtained an authorised Works Exeat Note for his purpose.

- 6 2 Although an employee is entitled to have sight of his clock card, the clock attendant shall not permit an employee to clock his own card, to write or enter anything on the card, nor to remove it from the clocking station.
- 6 3 Time not recorded mechanically on a clock card (i e, manual entries) must be approved by, and signed for by the Chief Security Officer or his deputy.
- 6 4 Time already entered on a card but which is to be altered, must never be erased or be ~~blotted~~ out. It must be deleted by a single stroke of the pen in order that the original entry may still be legible. The amendment must be entered adjacent to the original entry which is deleted. It must be approved by, and signed for by the Chief Security Officer or his deputy. Amendments/manual entries must be referred to the Chief Security at 08h00 every morning. Signed cards must be submitted to the Time Office by 09h00.
- 6 5 The Time Office shall not accept an amended card unless it is approved by, and signed for, by the Chief Security Officer or his deputy.
- 6 6 The Time Office is responsible for the mechanical preparation on the addressograph of new sets of weekly clock cards. The clock attendant shall refuse to accept and return to the Time Office cards not prepared accordingly, even if they are for newly engaged personnel.
- 6 7 The attendant may for single clocking purposes only, e g, where an employee reports for clocking while his proper card is with the Time Office, use a substitute card, made out in the name of the employee concerned and signed by himself (The attendant).
- 6 8 The Time Office will on certain days require the clock cards for comparison of the hours recorded with that booked on the daily time sheets.

6 9 The clock attendant must immediately report any fault in the clocking equipment, e g, clocks out of commission, clocks running slow or fast, to the Chief Security Officer for remedial action. In all instances where the attendant is unable to clock cards due to any fault in the clocking equipmnet, the requirements per items 6 3; 6 4 and 6 5 apply.

Result - once again - automatic and near basic source control via the ever present twin streams of real, nominal and psychological control.

2 3 5 The odd -few minutes off- - the human aspect of the continuous process employee

i The problem

In a continuous operating plant working twenty-four hours per day, seven days a week, the problem arises of shift employees requesting -a few minutes off- to conduct urgent personal business - a reasonable request when the hours of work and conditions of their employment are seen in the background of the contemporary massive skilled, unskilled and semi-skilled labour shortage.

ii The solution

To grant such request WITHOUT pecuniary loss to the employees provided that such temporary absence is at all times kept within bounds. The means - a Works Exeat Note. As this is so straight-forward and self explanatory we reproduce hereunder an extract of the relevant section of the wages' function manual section 2 12 5 page 10 and 11.

2 12 5 Should an employee wish to temporarily leave the works in the course of his normal duties a Works Exeat Note must be completed in full.

Basis:

- (i) A foreman may grant permission for temporary absence with full pay for time not exceeding 1 (one) hour per day.
- (ii) Where the one hour so granted is exceeded, the Head of Department must decide if the employee is to be paid for the time off or not.
- (iii) In all instances of malpractice, the Head of Department will no longer allow any time off with pay.
- (iv) The Head of Department must in any event still sign the exeat note and delete the work -Pay- or -Deduct- in respect of the time off.

An employee who so wishes to leave the works must:-

- 2 12 5 1 Obtain from his foreman or chargehand an authorised Works Exeat Note.
- 2 12 5 2 Have his time (clock) card clocked out when he leaves and again clocked in upon his return.
- 2 12 5 3 Hand the exeat note to the Security Officer at the main gate when he leaves the premises and again report to the Security Officer upon his return.
- 2 12 6 The Security Officer will enter on the exeat note the time of leaving and of return, sign the note and forward it by messenger (not the employee) to the relevant Head of Department.
- 2 12 7 The Head of Department must sign the Works Exeat Note, delete either -Deduct- or -Pay- and forward the note to the Time Office.
- 2 12 8 Upon receipt of the Exeat Note from the Head of Department, the Chief Timekeeper will effect the necessary deduction from the hours of the employee involved where the word -Pay- is deleted on the Exeat Note.
- 2 12 9 In every instance where neither -Pay- nor -Deduct- has been deleted, the Chief Timekeeper will deduct the time involved.
- 2 4 Perpetual inventory - the operation, verification and adjustment cycle of static AND dynamic control

2 4 1 Scope

All inventories throughout the Works, in whatever shape, form or mass, are on a perpetual inventory basis with planned monthly and annual verifications, and adjustments, of theoretical to physical. It extends to, and covers fully:-

- 1 Raw materials
- 2 Consumable stores
- 3 Semi-finished products
- 4 Finished products - sections and bars

2 4 2 Inventory control

- a Custodianship, recording and transacting is in every instance completely divorced
- b Verification is effected strictly in terms of a predetermined programme known only to the chief accountant and the auditors of the group. Refer annexure 10.
- c The verification program is adhered to in all instances. Should discrepancies appear - early warnings signals - in any particular commodity, more frequent verification and an investigation into the causes of the discrepancies can be initiated.
- d Results of verifications are listed on preprinted numerical control

schedules. Inventory control section of the E D P department then tabulate the relevant ledger balances, and after reconciling for cut-off points and other adjustments, the final numerical surpluses or deficits are tabulated and evaluated. The completed inventory schedules are then forwarded to the financial accountant's section for investigation and explanation. On completion of the investigation the explanations for both positive and negative variances are noted in the appropriate column. This is then submitted to the chief accountant for action, where necessary, and approval.

- e Rectification of discrepancies are effected by special requisitions, based on the summary authorised by the chief accountant and signed by the financial accountant.
- f Control of discrepancies is effected by charging all adjustments to a special overhead expenses account falling within the Stores function - account 100/848 stock differences. This account is automatically compared and contrasted with the amount budgeted and provided for by means of an appropriate monthly tariff and the total variance is reported on monthly as part of the overhead expenses variances return to management.
- g The dynamic aspect of control comes into being when EARLY WARNING SIGNS i.e., untoward factors appear to trigger off the appropriate investigation which will result in the necessary remedial action.
Therefore the concept of comparison is control - a psychological aspect of dynamic management control - is constantly being promoted by the automatic comparison and reporting of variances of actual results from prognosed - budgeted - results. Thus by this constant action and interaction of the controls which permeate the spectrum, passive - static - management control can almost immediately become active - dynamic. And once again the inherent time lag of historical accounting has been, if not eliminated, then at least minimised!
- h Conclusion
Little attention has been paid to detail in this section as to the mechanics of the costfinding control involved as firstly the mechanics are merely the static controls of yesteryear dressed in the -fashion- of today, and secondly the actual inventory instructions as per annexures 9 1; 9 2; 9 3 and 9 4 are self explanatory.

Finally, in closing this all importance section, let us leave the reader as sole judge and adjudicator, of the success, or otherwise, of the operation of this system of control in the undertaking in question with its multi-million rand holdings of inventory, when we state that the annual amount budgeted for -Stock Differences - Account 100/848- is the magnificent sum of R3 600 AND the total audit fees for the group as a whole, with an annual turnover in excess of R30 million, does not exceed R20 000!

- 2 5 The umbrella that safeguards and protects - three advanced aspects of swift policy decisions expedited by express reporting

2 5 1 General

That forewarned is forearmed is indisputable. But, as often as not, the foundations of the forewarning faculties are -built on sand- or on instinct,

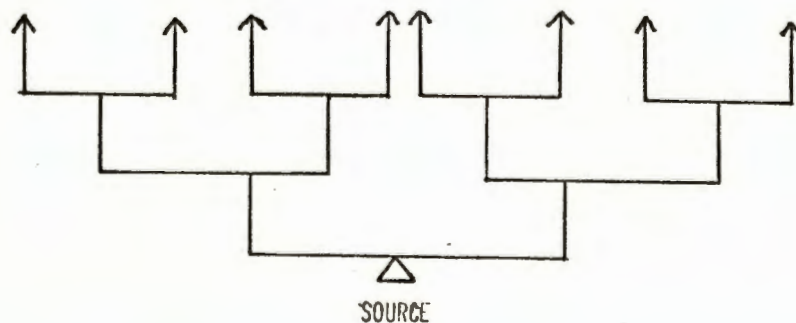
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highly dangerous, even disastrous. Warnings can, as often as not, be late and fallacious, or unfounded and non-existent. Early warning signals, to be conducive to scientific management, must be meaningful and timeous, and a prerequisite for this is the constant, active and effective presence of static and dynamic control in the form of the twin or dual streams that, in the right proportions, and at the right time, promotes scientific management control. These twin or dual streams of control are the basis of the costfinding system of management control installed at the undertaking in question.

To recapitulate the scientific management control system installed at Dunsward Iron and Steel Works, Limited consists of the three aspects of costfinding functioning as one inseparable whole. And costfinding itself is founded on the principle of control at the source of an event or transaction. Therefore from this source must flow all the streams of control that constitutes both automatic and near basic as well as dynamic management control.

Further, to comply with the definition of the scientific management control propounded in this thesis there must be an upward or reverse reporting or information flow to assure management that their instructions and policies are being carried out and to alert them with warning signs of actual or pending untoward factors.

Finally it must be stressed that the principle of control at the source of an event or transaction has as its basis the prerequisite that the maximum possible number of different controls must originate from the same source. Graphically depicted this would be:



2 5 2 Swift wages - productivity - variance reporting

- a As previously stated the wages compilation and computation is fully computerised. This application is so programmed that simultaneously with the wages compilation, and print out, AND USING THE SAME BASIC SOURCE DATA - the normal and overtime hours worked, analysis of the hours and overtime hours worked and the total cost per production and other cost centre is computed as an automatic by-product.
- Thus is compiled an analysis of the components of the labour cost incurred per activity, per average employee showing evaluated normal and overtime hours, and the number of employees per activity. An independent analysis which, as a further extension of the twin or dual streams of control, is distributed to line management THE DAY BEFORE THE EMPLOYEES RECEIVE THEIR REMUNERATION FOR THE PAST WEEK'S WORK. Refer annexure 11.
- The same analysis is made for the cost period. Refer annexure 11,1. And this is incorporated into the financial results for that month i e, cost period.
- This report can, if necessary, serve as a basis for a further statistical analysis should early warning signals so indicate. As an example, annexure 11,2 indicates the results of such an investigation based on the Bantu pay week ended 16th August, 1971. The necessary remedial action that the findings indicated is self explanatory. This illustration of one of the advanced aspects of early warning signals that emanate from the successful and scientific twin or dual operation of static and dynamic control, based on supervision at the source, is but an indication of the vast fertile fields of management control that are as yet untouched!

2 5 3 Numerical control of value by the tariff method of cost equation

cf Internal control etc ibid.

- a The successful operation of this method of control for some nine years has already clearly proved its success. Like all the other forms of management control at the Steel Works it is based on static and dynamic control with early warning signals triggering off remedial management action as and when necessary - the tentacles of the twin streams of control that safeguard and protect. The constant and successful operation of this tariff method of cost equation plays a major role in the -elimination- of the historic time lag referred to in section 5 4 4 that follows.
- b This method of management control operates in TWO parts.. One applying to the cost of replacement of integral moving and/or wearing components of a production unit, such as the mill rolls in a steel rolling mill, and the other providing for planned preventative maintenance at predetermined intervals as well as a certain calculated element to allow for extra ordinary and/or breakdown maintenance such as the high cost refractory relining of an electric arc furnace.
- It is founded on a prognosed i e, predetermined number of units or articles produced for a given period on specific production units.
- This tariff method of cost equation presupposes that every unit of production passing through the production cycle contributes a portion towards the replacement cost of the integral moving and/or wearing parts being consumed in the manufacture of that unit or production for a given volume of production as well as covering the costs of maintaining and servicing that production unit.
- Hence when the n^{th} unit or article has been produced as planned, the tariff levied has covered the costs of preventative and breakdown maintenance of the production unit in its entirety as well as having built up a credit balance in the relative provision account which theoretically should cover the replacement cost of the integral moving and/or wearing parts consumed in the production of the n^{th} planned unit produced.

c The tariffs to be applied for any given period are calculated in advance by the technical deputies of management, partly on an analytical basis i e, the cost of maintenance and replacement of similar moving and/or wearing parts on a given volume of production in the past, and partly on a synthetic basis i e, the cost of maintenance and replacement of similar moving and/or wearing parts for a given future volume of production at prognosed future conditions, and predetermined replacement cost.

d A tariff may further be derived by a set chargeout for units consumed where cost of production varies from month to month. This type of inverse calculation is then allowed a period for stabilisation, and once the actual costs have been ascertained, the chargeout is varied by management accordingly. Therefore in the inception of this type of chargeout tariff, while actual costs are being ascertained, there can be fluctuations in the tariff rate per unit of output. Thereafter only will tariff changes be effected when uncontrollable variances in the total cost structure manifest themselves, and are accepted by management.

In Dunsward Iron and Steel Works, Limited the following tariff accounts are in use and controlled as follows:-

i Producer gas

This is an inverse tariff where a rate of R3,05 per thousand cubic meters of gas consumed is charged to the consuming production department. Account number 811, preceded by the consumers cost centre code, enables this charge for producer gas to be shown on the relevant production cost statement for the month on line number 10. The cost of production of gas is accumulated in account number 184 and theoretically the tariff chargeouts for the month should equal costs.

ii Moulds and appliances

This is a normal tariff chargeout based on the monthly production of the user unit concerned. The tariff rate applied here is R1,00 per ton of ingot steel produced. Account number 821, preceded by the users cost centre code, enables this operating cost to be shown on the relevant production cost statement for the month on line number 20. Actual costs are accumulated in tariff number 279.

iii Mill rolls and tackle

This is a normal tariff chargeout based on the monthly production of the user unit concerned. The tariff rate is applied on the output of the various user units as follows:-

i	30" cogging mill	R0,16 per ton of output
ii	22"/18" heavy mill	R1,00 per ton of output
iii	12" medium mill	R0,65 per ton of output
iv	18"/12"/11" light mill	R0,65 per ton of output

Account number 822, preceded by the relevant cost centre code, enables this operating cost to be shown on the relevant production cost statement for the month on line number 20. Actual costs are accumulated in tariff account number 286.

iv Furnace linings - melting

This is a normal tariff chargeout based on a monthly production of the user unit

concerned at a rate of R0,15 per ton of molten metal produced. Account number 851, preceded by the relevant cost centre code, enables this operating cost to be shown on the production cost statement for the month on line number 36. Actual costs are accumulated in tariff account number 271.

v Furnace linings - reheating

This is a normal tariff chargeout based on the monthly production of the user unit concerned.

The tariff rate is applied on the output of the various user units as follows:-

i	30" cogging mill	R0,13 per ton of output
ii	22"/18" heavy mill	R0,12 per ton of output
iii	12" medium mill	R0,13 per ton of output
iv	18"/12"/11" light mill	R0,12 per ton of output

Account number 873, preceded by the relevant cost centre code, enables this operating cost to be shown on the relevant production cost statements for the month on line number 37. Actual costs are accumulated in tariff account number 276.

vi Maintenance - general

This is a normal tariff chargeout based on the monthly production of the user unit concerned at a rate of R0,15 per ton of ingot steel produced. Account number 873, preceded by the relevant cost centre code, enables this operating cost to be shown on the relevant production cost statement for the month on line number 42. Actual costs are accumulated in tariff account number 276.

vii Maintenance - mills

This is a normal chargeout based on the monthly production of the user unit concerned. The tariff rate is applied as follows:-

i	30" cogging mill	R0,20 per ton of output
ii	22"/18" heavy mill	R0,15 per ton of output
iii	12" medium mill	R0,15 per ton of output
iv	18"/12"/11" light mill	R0,15 per ton of output

Account number 873, preceded by the relevant cost centre code, enables this operating cost to be shown on the relevant production cost statement for the month on line number 37. Actual costs are accumulated in tariff account number 276.

viii Straightening machine rolls

This is a normal tariff chargeout based on the monthly tonnage that has passed through these machines for straightening at a rate of R0,19 per ton. Account number 846, preceded by the relevant cost centre code, enables this operating cost to be shown on the production cost statement for the month on line number 26. Actual costs are accumulated in tariff account number 282.

ix Scrapped production, stock shortages etc, manufactured steel

This is a normal tariff chargeout baed on the monthly finished production of each unit concerned. The tariff rate is applied as follows:-

1	Furnaces	RO,10 per ton of ingot steel
2	Rolling mills	
2 1	30" cogging mill	RO,10 per ton of output
2 2	22"/18" heavy mill	RO,42 per ton of output
2 3	12" medium mill	RO,17 per ton of output
2 4	18"/12"/11" light mill	RO,25 per ton of output

Account number 847, preceded by the relevant cost centre code, enables this operating cost to be shown on the relevant production cost statement for the month on line 32 for furnaces, and line number 27 for rolling mills. Actual costs are accumulated in tariff account number 296.

- e Thus is established in advance a tariff rate per unit of production which, when accepted by management, becomes a fixed element of the cost of each unit produced and can only be varied with the express approval of management. There are therefore two main categories of tariff accounts maintained i e, one class for replacements of moving/ wearing parts, and one class for maintenance and service and accordingly identified in the plan of accounts.
- f Replacement parts, and all other spares and consumable stores are retained for safekeeping at either the main store or the relevant site location sub store. Replacements are only issued, as are all other stores, on a duly authorised stores withdrawal requisition. There is, however, the difference that instead of the normal cost centre code being allocated on this stores issue requisition, the relevant general ledger tariff account code is inserted. This then routes the cost of replacements not to the current months working costs i e, against revenue, but via the stores usage summary to the requisite provision account.
- g With regards maintenance the same procedure is followed with the only difference being that service departments - workshops - allocate the European hours spent on the repair and/or maintenance job and the requisite provision account is debited at the current cost centre recovery rate. The credits of these tariff provision accounts are raised monthly when the total number of units produced are known by means of a standard monthly journal voucher wherein the number of units produced, multiplied by the tariff rate, is debited to the cost centre and credited to the tariff provision account. Thus on the monthly production cost statements the tariff charge in the unit cost column will be constant - any actual abnormal variations will be -sponged- in the provision equation. Any unauthorised changes in the set tariff charge - the norm - will be seen immediately by management or its deputies when the monthly production cost statements are scrutinised.
- h THE APPLICATION OF THESE PREDETERMINED TARIFF RATES TO PRODUCTION, AS ILLUSTRATED ABOVE, IS THE FIRST PART OF THE DUAL ASPECT OF CONTROL BY SUPERVISION AT THE SOURCE. THE SECOND PART IS THE SUPERVISION AT THE SOURCE OF THE USAGE i e, TARIFF PROVISION ACCOUNT MOVEMENT IN THE GENERAL LEDGER. DEBIT BALANCES ON PROVISION ACCOUNTS INDICATE THE PRESENCE OF UNTOWARD FACTORS WHICH ARE UNDER- STATED COSTS AND CONSEQUENTLY OVERSTATING INCOME. THE UNTOWARD FACTORS ARE

...../ascertained

ASCERTAINED AND REPORTED TO MANAGEMENT, AND IF NECESSARY, MANAGEMENT WILL AUTHORISE AN UPGRADING OF THE TARIFF RATE. ABNORMAL CREDIT BALANCES LIKEWISE WILL BE INVESTIGATED AND THE REASON THEREFORE ASCERTAINED AS COSTS ARE BEING OVERSTATED AND REVENUE UNDERSTATED. IF NECESSARY MANAGEMENT WILL AUTHORISE A DOWN GRADING OF THE EXISTING TARIFF. NORMAL CREDIT BALANCES ON TARIFF PROVISION ACCOUNTS REPRESENT THE EXTENT TO WHICH PAST PRODUCTION HAS CONTRIBUTED TOWARDS FUTURE REPLACEMENTS AND MAINTENANCE. A monthly analysis report is circularised to management or its deputies specifying each tariff provision account with a detailed usage summary. This report is so set out as to enable a comparison to be made of the current month with the previous month, and the year to date as follows:-

- 1 Opening balance
- 2 Tariff Input
- 3 Charges against provision
- 4 Favourable or adverse net mutation for the period
- 5 Closing balance

The first page of this report is in the form of the usual untoward factors report and, as all management information presentation promotes management by exception, only adverse factors are disclosed.

- i ANOTHER FORM OF AUTOMATIC MANAGEMENT CONTROL THROUGH SUPERVISION AT THE SOURCE IS THAT IN NO CIRCUMSTANCES WHATEVER MAY PARTS BE REPLACED OR MAINTENANCE DONE WHICH WILL INVOLVE MORE THAN R500 WITHOUT THE PRIOR AUTHORISATION OF MANAGEMENT. Where such excesses are imminent a standard extraordinary maintenance/deferred revenue application form is to be completed, not only detailing the nature, extent and cost of the proposed job, but also giving the reasons therefor. This application is authorised by management and routed to the chief accountant's office where a special job number is allocated to the proposed job. All time, materials etc, are charged against this job number, and on completion of the job all details are again routed to management for scrutiny and comparison of actual cost with estimated cost.
- j Accounting wise, at month or period ends, the control account of these provisions is included in the current liabilities and provisions section of the accounts, and is a reduction of working capital. Where these provisions become excessive i.e., become reserves, yet in reality do not form part of equity, the total is designated as a provision for future maintenance, repairs and replacements. This provision is then reflected separately in the accounts after the proprietary interests, but before longterm liabilities - thus clearly indicating that it is not free for distribution but is rather in the form of a -fund-. In conclusion it can be said of the numerical control of value by the tariff method of cost equation at present being pioneered, that its future applications are unlimited. IT CAN APPLY WITH EQUAL FORCE TO CONTROL BY MANAGEMENT SUPERVISION AT THE SOURCE IN ANY MANUFACTURING INDUSTRY, WHETHER A TARIFF BE APPLIED TO MACHINE TOOLS IN A FULLY AUTOMATED ENGINEERING CONCERN, OR TO THE CONTENTS OF CONTAINERS IN A LABOUR INTENSIVE MEAT PACKING INDUSTRY.

In conclusion it must be emphasised that this method in no way endeavours to change the historical concept of depreciation accounting to that of replacement accounting but only endeavours to effect a compromise between -last in - first out-, management control through effective supervision at the source, and sound production economics. In fact a forerunner of a -new look- form of standard costing based on prognosis, not diagnosis, with immediate remedial action as the norm.

Finally as it is virtually -tailor made- for complete computerisation - the accountant of tomorrow - it is submitted that it will stake its claim to recognition in the industrial giants of the future.

2 5 4 The -elimination- of the time lag in monthly reporting - the epitome of vibrant dynamic management reporting

Today, throughout the world, accounting and cost accounting systems, in one form or another, are synonymous with successful and profitable operation. Usually accepted as prudent practice, in the more dynamic undertakings with full computerisation, is the presentation of monthly management information within two to six weeks after the cost period end. Contemporary managements accept and condone this, the reason for their acceptance, the fait accompli of the inherent time lag of historical accounting. But is this historical time lag really insurmountable? In the fully mechanised integrated management accounting and costfinding system installed at the undertaking in question in 1965, the solution has been found by way of twin or dual streams as follows:-

i Value

Fully mechanised ledgers and cash books etc. Each amount in the main ledger being the control account of a sub-ledger. Conventional accounting machines with punch to tape units effect all entries simultaneously from the same basic source data - twin or dual streams of control. All journal and other source data vouchers are in numbered pre-printed monthly sets - refer annexure 12 - which is the index of a set of these monthly standardised journal vouchers. The punch tapes which are by-products of the posting of these journal entries feed the computer and the resultant printouts, in turn, constitutes the basis for further distributions of value.

ii Numerical

A memorandum numerical costfinding system is operated in tandem with the accumulation of value as per (i) in the costfinding section. This section operates independently with their basis being the accumulation of shopfloor and other resources of numerical data collection and collation.

The merging of the collection and collation of this numerical and value data - again the twin or dual streams of control - derived per unit of production, result in the detailed financial and cost statements as a period end. But all this data is only made possible by the constant and ever-present operation of static and dynamic control in all the phases of the undertaking as already discussed in this thesis. These monthly results being published and distributed in five stages as follows:

- 1 Estimated profit statements on the third day after the period end - annexure 13 1 and 13 1 1

- 2 The deviation of actual profit and inventory total and unit costs from the estimated completed on the fourth day after the period end - refer annexure 13. This is the detailed reconciliation of the differences between the estimate and the actual - again the twin or dual streams of control in operation.
 - 3 Balance sheet, income statements and full detailed cost statements analysing and tabulating the elements of the cost of every unit produced in the plant for the past cost period i e, month, the previous month, and the year to date. These detailed statements are distributed on or about the seventh day of the month following the period end. No annexure can be attached here as these sets of accounts and cost statements are in bound books of approximately sixty pages.
 - 4 Untoward factors report of prognosed events and trends based on the current data. These reports are distributed on or about the eighth day after the period end. Again no annexure can be attached.
 - 5 Detailed value and numerical statistics including variances from the budget of all the production for the period and year to date expressed in units as well. These statistics are released on or about the ninth day after the period end. Again no annexures can be attached.
- a The management information and costfinding system is founded on the optimum action and interaction of both the static and dynamic streams of control that merge and operate in harmony so as to result in the marrying up of the numerical with value, all based on source control, to culminate in swift policy decisions based on express reporting as the inlet to the highway of scientific management control.
- cf The segmented multiple twin or dual tentacles of all the streams of control that eventually permeates the spectrum can now best be left to the reader's imagination. But reader, please note that duality of everything - the twin streams
- b Finally as an illustration of the speed and simplicity of the method involved in compiling and deriving data, as well as demonstrating that costfinding is not a new and revolutionary feature but merely one that explores an old universe in a new way, the following example is quoted:
- 1 The estimated net profit for the month, per annexure 13 1 is merely the cumulative excess of assets over liabilities LESS the opening difference, from which is added or deducted the estimated increase or decrease in closing inventory which is merely the numerical i e, number of units derived from the numerical control section AND EVALUATED AT THE PREVIOUS PERIOD'S CLOSING INVENTORY COST. The deviation of the actual net profit from the estimated one is merely the variance between the previous month and the current month's actual unit costs as per annexure 13.
- c The Reliability of the Data
- This, of course, is the test of any set of financial statements. Are they true and fair? May we answer this by delving back as far as the financial year ended 30th June, 1968. The printed advance report to shareholders - annexure 14 - was circulated on the 31st July, 1968 AFTER takeover negotiations had been completed for an old established foundry. The audited group accounts released later co-incided exactly. For the financial year ended 30th June, 1967 the printed advance report to shareholders WAS CIRCULATED ON THE 5TH JULY, 1967 - refer annexure 15. Again the audited group accounts required no changes.

SECTION III

CONCLUSION

INDIRECT COSTS

THEIR COLLECTION, ALLOCATION, APPORTIONMENT AND CONTROL

(pages 7 118 - 7 178)

CHAPTER VII

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- 1 Indirect costs as a management problem and the problem of managing indirect costs
- 2 The costfinding flow
- 3 Indirect cost collection, allocation apportionment, and control - an empirical review
 - 3 1 Overheads
 - 3 1 1 Why overhead is a problem
 - 3 2 Other indirect costs
 - 3 2 1 Controllable and uncontrollable indirect costs

7 INDIRECT COSTS - THEIR COLLECTION, ALLOCATION, APPORTIONMENT AND CONTROL

1 General

This chapter is concerned primarily with indirect costs as a management problem and with the problems of managing indirect costs. In it we shall review indirect costs, their definitions, methods of control, the reporting of variances, and the methods of apportionments to production profit and cost centres as done by the costfinding system installed in the Dunswart Iron and Steel Works, Limited group of companies. This installation divides indirect costs into two parts which consist firstly of overhead expenses and secondly of other indirect costs and it is in this sequence that the incidence and impact of indirect costs upon the undertaking as a whole will be reviewed.

In this review we will also, of necessity, deal very briefly with direct costs in order to demonstrate the flow of the segments and components that as a whole constitute costfinding.

This chapter can therefore said to be dedicated to the senior and middle management who must control indirect costs, keep them within reasonable bounds yet must provide the services that are so essential to the well-being of the undertaking, to those who must find and maintain the balance between the demand of production management for services such as maintenance and the amounts allocated therefor by financial management. The accomplishment of which must be effected in a cost intensive industrial world hampered by an acute shortage of skilled, semi-skilled and clerical labour.

As an illustration of the changing ratio between direct and indirect labour it can be quoted that in the U S A, the most highly automated industrial country in the Western World, it has been estimated that in one generation the ratio of direct labour to indirect labour was changed from 10 is to 1 to 5 is to 1. This is an alarming indication

of what is to come and how absolutely essential it is to control scientifically the incidence and productivity of high-cost indirect labour.

In this chapter indirect costs are seen in the context of Ryall R J H as -costs which cannot be directly measured or charged to a specific article, order or process, but which can only be apportioned according to some logical method-.

cf Ryall R J H - Dictionary of Costing - Sir Isaac Pitman and Sons Limited, London.
Second edition 1938.

Ryall continues his definition by stating that indirect labour is that labour which may be usefully employed in the undertaking in such work as sweeping the shop floor, attending to the issue of materials from stores, repairing the plant and machinery, or supervising the workers of a department. In the Dunswart Iron and Steel Works, Limited group of companies this is the accepted definition and it has been extended to cover overheads as well. Therefore indirect cost can be summarised as the total of all costs incurred in running the undertaking OTHER THAN DIRECT COSTS. And it is in this context that this chapter must be read. Where necessary for the sake of clarity in outlining the undertaking's policy, relevant definitions will be repeated and perhaps slightly changed, but as these policies and definitions have proved successful in rejuvenating an -aged- industrial concern and, after all, the results achieved are the measure of the success attained, we leave the judgement of the success of the measures instituted to the reader.

2 The costfinding flow

At the Dunswart Iron and Steel Works, Limited group of companies the undertaking is divided into profit centres. The definition applied to profit centre is that it is a division which derives revenue from the sale of its finished product. Thus it derives revenue

...../from

from its selling activities and this revenue is credited to it and after deduction of its total operating costs including apportioned indirect costs as well as overheads but excluding selling and distribution expenses, its own manufacturing profit or loss can be calculated. A profit centre includes not only the manufacturing costs charged to its cost centres and the cost of its own general management but also a share of all general overheads and indirect costs as allocated to it.

A profit centre consists of all the cost centres that serve it directly or indirectly. A cost centre is defined as a division, a department or sub-division thereof, a group of machines or of men or of both, a single machine and its operating force, or any other unit of activity into which an undertaking is divided for purposes of cost assignment and allocation. From this definition of a cost centre as applied in the Dunswart Iron and Steel Works, Limited group of companies it is apparent that overheads, being classified functionally, and falling into the classification of -any other unit of activity- of the definition, is as much a cost centre as is any section of the undertaking.

The performance of a cost centre is measured in terms of its cost and output whether this output be in services (or other intangible) or in tangible units of performance.

The performance of a profit centre is measured as if it were an independent company and a manufacturing profit or loss is determined monthly in total and per unit of finished steel produced.

In the costfinding installation at the undertaking in question profit centres were established at the following eleven finished production inventory terminals:

- 1 Ingot stock
- 2 Billet stock
- 3 22"/18" mill section and bar
- 4 22"/18" mill tube and grizzly bar

- 5 30" mill section and bar
- 6 12" mill section and bar
- 7 18"/12"/11" mill section and bar
- 8 Re-cut section and bar
- 9 2nd grade section and bar
- 10 Sponge iron - first grade
- 11 Sponge iron - second grade

The reason that these profit centres are briefly discussed in a chapter dealing with indirect costs is to illustrate that in the schematic flow of cost centres, as defined above, it is essential to commence at the end of the flow and then to follow it in reverse back to the cost centre statement which is the termination point of, inter alia, all accumulated indirect costs.

As an illustration of the format of the uniform profit centre statement applicable in all instances we reproduce below the billet profit centre statement.

...../Continued on following page

DUNSWART IRON AND STEEL WORKS, LIMITEDINTERMEDIATE STOCKS STATEMENT B102 Profit Centre Statement - Billets

Line	Acct. Code	DESCRIPTION	Month's Cost		Cost Per Ton	
			Quantity	Value	This Month	Previous Month
1		Opening Stock of Billets				
2		Cost of Billet Production on 30" Mill				
3		Cost of Billet Production on 22/18" Mill				
4		Cost of Billet Production - C.C. Plant				
5	164	Billets Purchased				
6	839	Billet Yard				
7		Billets Available for Disposal				
8	968	Stock Adjustment				
9	985	Billets Scrapped				
10	972	Billets Used in Works				
11		Billets Available for Rolling				
12		Issue to 22/18" Mill for Sections and Bars				
13		22/18" Mill - Blooms for re-rolling				
14		12" Mill				
15		18/12/11" Mill				
16		Billets available after issue to Mills				
17		Cost of Sales				
18		Closing Stock				
19a		Sales - Continuous Casting Plant				
19b		Sales - Mills				
20		Cost of Sales				
21		Manufacturing Profit				

Working back to the cost centre statement where the cost of billet production per the continuous casting plant as per line 4 of the profit centre statement originates from, we reproduce the relevant cost centre statement number E.2.

...../Continued on following page

Acct. Code	COST ACCOUNT	%	Unit	Unit Cost	Pro
	Liquid Steel Input - BS 15		Tons		
			Tons		
			Tons		
	B 84/8 Cr. (T.M.B.)		Tons		
			Tons		
			Tons		
	ST 37/2 + ST 37/1		Tons		
			Tons		
987	Residual Credits - Crop Ends		Tons		
	- Scrapped Production				
982	- Skulls		Tons		
983	- Spillage		Tons		
983	- Liquid (Scrap)				
	Yield/Material Cost				
801/2	PERSONNEL COSTS				
803	Direct Labour				
804	Auxiliary Wages				
805	Overtime Premium				
806	Paid Holidays				
807/8	Salaries				
	Statutory Deductions				
	Total Personnel Costs				
826	FUEL		Kg.		
814	Propane Gas				
	Oxygen				
	Total Fuel				
817	POWER		1000 kWh		
818	Electricity				
827	Compressed Air				
	Water (Including Treatment Expenses)				
	Total Power				
821	Moulds				
830	Refractories		Kg.		
825	Operating Material				
841/2/3	OTHER OPERATING COSTS		Hours		
844/5	Other Transport Costs				
847	Tests, Analysis, Trials				
849	Irrecoverable Costs due to Scrap Returns, etc.				
850	Miscellaneous Operating Costs				
	Miscellaneous Credits				
	Total Other Operating Costs				
861	PLANT MAINTENANCE				
862	Own Maintenance Labour				
864-870	Maintenance Material				
863	Workshops Operating Rates		Hours		
872	Spare Parts				
873	Maintenance by Outside Contractors				
886	Maintenance Tariff				
	Credit for Repair Scrap				
	Total Plant Maintenance				
890	CAPITAL CHARGES				
	Depreciation				
	Interest				
	Total Capital Charges				
	Specific Processing Cost of Continuous Casting Plant (12 to 49)				

ne	Acct. Code	COST ACCOUNT	%	Unit	Unit Cost	Prod Qu
		Specific Processing Cost of Continuous Casting Plant (12 to 49)				
		WORKS OVERHEAD				
		Works Services				
		Welfare Services				
		Administrative Services				
		Total Works Overheads				
		Total Processing Costs (12 to 56)				
	839	Billet Yard				
		Continuous Casting Plant Cost of Good Production (11 + 57 + 59)				

To demonstrate how the profit centre and cost centre statements correlate and tie up with each other, reference must be made to line 62 of cost centre statement E 2 - cost of good production. This is the tonnage, total and unit cost of good production transferred to line 4 - cost of billet production as per profit centre statement B 10.

Having now briefly shown the workings of the profit and cost centre statements in full in all the components of cost, both direct and indirect, we can now proceed to discuss in greater detail indirect costs - their incidence, definition, collection, allocation, apportionment and control.

3 Indirect cost collection, allocation, apportionment and control - an empirical review.

The term indirect costs as applied at Dunswart Iron and Steel Works, Limited is meant in the generic sense as it includes all the -burden- of the undertaking at whatever organisational level it is incurred. Indirect costs including overheads are therefore all the expenses incurred in running the business both of the Plant and the offices etc.,

...../which

which cannot be charged directly to one product or process but only apportioned according to some chosen method. No feature of cost accounting is more difficult than the treatment of indirect costs, and this item has received in general the least attention due to the general and erroneous impression of its extremely elusive nature. Yet if these indirect costs are dealt with in a scientific manner great possibilities of savings are presented as they can be calculated and scientifically controlled with a surprising degree of accuracy.

The correct definition and treatment of indirect costs have now for many years been the subject of discussion of the pundits. As far back as 1938 Ryall R J H stated that the correct treatment of this subject in most systems of cost accountancy will require that the total -establishment expenses- - indirect costs - be subdivided so that they can be dealt with in three or more groups viz:-

cf Ryall R J H - Dictionary of Costing op cit.

- i Factory expenses
- ii Selling and distribution expenses
- iii Administration expenses

This grouping of expenses is necessary as by their division the correct proportion of the indirect items can be charged to the respective departments, products or process, and the actual cost of the sales and administrative departments can be ascertained separately from the factory or works cost.

In a flow process, such as a basic steel works, there are so many aspects of indirect costs involved in the production process that a normal cost accounting system which accumulates indirect costs including overheads in the three divisions listed above would provide inadequate management information and control. Seen further in the light that at Dunswart Iron and Steel

...../Works

Works, Limited indirect costs constitute almost seventy per cent of the specific processing cost of steel, the absolute necessity for scientific management control over indirect costs becomes only too clear.

It was therefore necessary to divide all functions into cost centres and to route all costs incurred to a cost centre on a functional basis as described in an earlier chapter and, as in any large undertaking there are certain organisational expenses which are incapable of being classified as any but general overhead expenses, expenses of such a nature were accordingly classified and collected under suitable overhead headings.

Ryall further states that the work entailed in the treatment of this subject in a cost accounting system will require to be done in the following stages:

cf Ryall R J H - Dictionary of Costing op cit.

- i Collection, which refers to the collection and transfer of expenses - indirect costs - from the financial or -suspense- accounts to the cost - production - accounts.
- ii Allocation, which is the work of analysing each item of expense into its respective group.
- iii Computation and recovery, which refers to the method by which the expense rate is calculated and recovered in the individual cost accounts.

In costfinding, as in all systems of cost accounting, this collection, allocation and computation is also effected but in a difference manner. The principle difference is that the allocation of all indirect costs, as with direct costs, is effected at the source i e, the organisational point where it is incurred or originates. This facilitates effective control at the source of a transaction, and it is this principle of control that is termed source control and forms the foundation of all the aspects of the costfinding that this thesis advocates.

The method of achieving this allocation at the source of all transactions is the coding system that is in use. The entire undertaking is divided into functional direct and indirect cost

...../centres

centres as set out previously. The coding consists of six digits and combines a cost centre as well as accounts code. The first digits indicates the cost centre and the final three digits indicates the accounts code or nature of the transaction.

Reference to annexure 16 reveals that the cost centre codes for the undertaking commence at code 100 for general and continue to cost centre code 570 which is in respect of the latest expansion scheme, the sponge iron plant.

For the sake of convenience the cost centre codes are tabulated hereunder viz:

DUNSWART IRON AND STEEL WORKS, LIMITED

<u>COST CENTRE CODE</u>	
100	GENERAL
300	MELT SHOP
310	SCRAP YARD
320	FURNACES
330	LADLE MAINTENANCE
340	CASTING BAY
400	ROLLING MILLS
410	30" COGGING MILL
411	SOAKING PIT
412	ROLLING
413	ELPIT
420	22"/18" HEAVY MILL
421	RE-HEATING FURNACE (NO. 2)

422		NO 1 & 2 ROLLING TRAIN	
423		NO 3 & 4 ROLLING TRAIN	
424		COOLING BED	
430	18" HEAVY MILL		) THIS MILL) DEMOLISHED.) THESE CODES) NOT TO BE) USED.
431		RE-HEATING FURNACE	
432		ROLLING	
440	12" MEDIUM MILL		
441		RE-HEATING FURNACE (NO. 4)	
442		ROLLING	
443		COOLING BED	
450	18"/12"/11" LIGHT MILL - SIEMAG		
451		RE-HEATING FURNACE (NO 3A)	
452		ROUGHING TRAIN	
454		FINISHING TRAIN	
455		COILING	
456		COOLING BED	
460		MILLS DESPATCH	
461		RE-CUTTING AND RECLAMATION	
550	CONTINUOUS CASTING PLANT		
570	SPONGE IRON PLANT		

The accounts code (the last three digits) indicating the nature of the transactions is summarised as follows:-

ACCOUNTS CODE

900	MATERIALS USAGE
800	OPERATING COSTS INCLUDING WORKS SERVICES
700	CAPITAL AND MAINTENANCE PROJECTS - WORK IN PROGRESS
600	WELFARE SERVICES
500	SELLING AND DISTRIBUTION EXPENSES
550	SALES - MANUFACTURED AND OTHER PRODUCTS
400	ADMINISTRATIVE SERVICES
300	MISCELLANEOUS PROFIT AND LOSS
200	BALANCE SHEET - LIABILITIES
100	BALANCE SHEET - ASSETS

Therefore the cost centre code prefix identifies the nature of the transaction to a specific area of the undertaking and hence this transaction is absorbed into and forms part of the relevant cost centre total cost. When the throughput of this cost centre for the period under review is reported the total and unit cost of its production is calculated.

As an illustration of this principle let us assume that a melt shop furnace number 5 is loaded with fifty tons of steel scrap. The materials issue requisition will be coded 320/903.

This coding is construed as follows:-

i	Cost centre code		
	300	=	melt shop
	20	=	furnaces
ii	Accounts code		
	903	=	scrap (general) Issues

To enable scientific management control of the input, efficiency and output of each furnace there are separate series of meltsheets with different numerical sequences and colours for each furnace.

Operational efficiencies etc., are compiled and tabulated for each production unit in the form of a plant and operating data statistics statement which is incorporated into the monthly cost statements and here the input and output, efficiency, reasons for breakdowns, operating times and number of operations, etc, for furnace number 5 mentioned above will be summarised.

As this principle of reporting on operational efficiencies applies to all the production units of the undertaking, and relevant operating statistics are compiled for each cost centre throughout the Plant, the above illustration of the charge to furnace number 5 has been given as an example of the depth and extent of the coverage of costfinding control to production in general.

The cost centre prefix code 100 indicates items or transactions of so general a nature that they cannot be attributed to any one or more sections of the undertaking in particular and it is to these indirect costs, their collection, collation and apportionment that this chapter is dedicated.

And, as previously stated, due to their magnitude and importance, indirect costs will now be reviewed in the broad divisions of overheads and other indirect costs.

3 1 Overheads

These are the expenses incurred in running the business both of the Plant and the offices which cannot be charged directly to any one product or process but only apportioned according to some chosen method. The cost centre code is 100 and the relevant accounts code collects the expenses under the appropriate functional cost head.

In the Dunswart Iron and Steel Works, Limited group of companies overheads are divided into two main categories. Firstly there are those which are classified as purely financial

...../charges

charges and therefore should not be absorbed into the cost of the manufactured steel. This category is a charge against income in the profit and loss account and shown accordingly.

These expenses are represented by the 300 plan of accounts series.

3 1 1 Non-distributable overhead expenses

a Financial charges

Indirect expense accounts collect and collate the various items of income and expenditure which are classified as purely financial and non-recurring, and can therefore not be absorbed into the manufactured cost of steel without distorting operating results either in the current or the comparative period. Such charges are absorbed in the period that they are incurred and in the main are based upon the classical exponents of pure cost accounting's definition of general overhead.

These are:-

MISCELLANEOUS PROFIT AND LOSS - MONTHLY ACCOUNTS

<u>COST CENTRE CODE</u>	<u>ACCOUNT CODE</u>	<u>ACCOUNTS DESIGNATION</u>
100	301	DISCOUNTS RECEIVED
100	302	DISCOUNTS ALLOWED
100	303	
100	304	
100	305	DEBENTURE INTEREST
100	306	INTEREST ON OVERDRAFT
100	307	INTEREST PAYABLE ON LOANS
100	308	INTEREST RECEIVABLE ON LOANS
100	309	SUNDRY REVENUE
100	310	MISCELLANEOUS EXPENSES
100	311	

100	312	COMMISSIONING COSTS
100	313	DONATIONS
100	314	INTEREST - OTHER
100	315	PROFIT AND LOSS - DISPOSAL OF ASSETS
100	316	BAD DEBTS RECOVERED
100	317	PROFIT AND LOSS - SHARE TRANSACTIONS
100	318	
100	319	INTEREST - SWISS FRANK NOTES
100	320	- IMPORTED MACHINERY
100	321	DEBENTURE TRUSTEES REMUNERATION
100	322	DIVIDENDS RECEIVED
100	323	NON RECURRING REVENUE

As this category of expenses are not apportioned out but remain in total in their appropriate classifications and are written off in the period that they are incurred, and are thus self explanatory, they warrant no further discussion.

b Selling and distribution expenses

A subdivision of the above category of expenses is made for those that are classified as selling and distribution expenses and, as these cannot be related to the cost of the manufactured steel they should be written off against sales income in the same period. To illustrate this type of expense an extract of the relevant section of the plant of accounts is tabulated hereunder:

SELLING AND DISTRIBUTION EXPENSES

<u>COST CENTRE CODE</u>	<u>ACCOUNT CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
100	501	ADVERTISING	ALL CHARGES FOR ADVERTISING INCLUDING ANY TRANSFERS TO SALES AID PROVISION.

100	502	CARTAGE ON SALES - STEEL	ALL CARTAGE CHARGES INCURRED
100	603	- CASTINGS	ON DESPATCHES, AGAINST WHICH
			IS CREDITED CARTAGE CHARGES
			INVOICED TO CUSTOMERS
100	504	COMMISSION ON SALES - STEEL	ALL COMMISSION PAYABLE TO
100	505	- CASTINGS	COMPANY AGENTS
100	506	SALES SALARIES	ALL SALARIES ATTRIBUTABLE
			TO SALES STAFF
100	507	SALES EXPENSES	ALL TRAVELLING EXPENSES,
			CAR EXPENSES AND GENERAL
			EXPENSES OF DEPARTMENT
100	508	EXPORT EXPENSES	SALES EXPENSES INCURRED IN
			EXPORTS (EXCLUDING FREIGHT),
			SUCH AS INSURANCE

Selling and distribution expenses consist of the account number series 500 and range from account number 501 to account number 508.

As selling and distribution expenses refer solely to sales, sales are automatically included in the same account number series and are identified by account numbers 551 - 570. To demonstrate this category we append hereunder the relevant part of the plan of accounts that refer to sales viz:-

<u>COST CENTRE CODE</u>	<u>ACCOUNT CODE</u>	<u>ACCOUNTS DESIGNATION</u>
100	551	SALES - 2ND GRADE FINISHED PRODUCTS
100	552	- BILLETS - ROLLED PRODUCTS
100	553	- CONTINUOUS CASTING PLANT PRODUCTS
100	554	- STEEL BARS ORD. - 12" MEDIUM MILL
100	555	- STEEL BARS ORD. - 18"/12"/11" LIGHT MILL-SIEMAG
100	556	
100	557	
100	558	- STEEL BARS ORD. - 22"/18" MILL
100	559	- STEEL BARS - TMB & GB - 22"/18" MILL

100	560	- STEEL BARS ORD. 30" COGGING MILL
100	561	- RE-ROLLING CUSTOMERS OWN PRODUCTS
100	562	- STEEL INGOTS
100	570	- SPONGE IRON

The 500 account number series together with the cost of manufacture of the finished steel sold, transferred through inventory accounts from the manufacturing account, represents the trading account and therefore the excess of the credits over the debits is the gross profit for the period.

3 1 2 Overhead expenses distributable to production

The second category of overhead expenses is that which permeates throughout the undertaking and by its nature represents charges against production. As such these expenses must be apportioned out on an equitable basis to the relevant cost centres they serve. The difference between this category of indirect costs or expenses and the first category lies in the fact that this latter category is distributable whereas the first category is non-distributable.

In the costfinding installation implemented in the Dunswart Iron and Steel Works, Limited group of companies, overhead expenses have been defined into the following main functional cost centres viz:-

	<u>COST CENTRE CODE</u>	<u>ACCOUNTS CODE</u>	<u>DESCRIPTION</u>
i	100	401 - 411	Administrative - secretarial
ii	100	421 - 434	- accounting
iii	100	441 - 451	- general
iv	100	601 - 651	Welfare
v	100	848	Stores differences
vi	100	891 - 986	Works services

In turn each main functional cost centre consists of functional sub-cost centres for control purposes.

To demonstrate the deliniation of these functional sub-cost centres we append hereto an extract of the plan of accounts relevant to distributable overhead expenses as defined and applied

...../in

in the undertaking in question.

OVERHEADS

COST CENTRE CODE	ACCOUNTS CODE	ACCOUNTS DESIGNATION	TOTAL
		1 Administrative services	
100	401	1 1 Secretarial Salaries and wages	
100	402	Postages, telephones, etc	
100	403	Printing and stationery	
100	404	Legal expenses	
100	405	Insurances - general	
100	406	Bad debts	
100	407	Staff refreshments	
100	408	Publications	
100	409	Subscriptions	
100	410	Iscor co-ordinating council	
100	411	General expenses	
		TOTAL:	

COST CENTRE CODE	ACCOUNTS CODE	ACCOUNTS DESIGNATION	TOTAL
100	421	1,2 Accounts Salaries and wages	
100	422	Office machinery rental	
100	423	Office machinery maintenance	
100	424	Time office expenses	
100	425	Bank charges	
100	426	Audit fees	
100	427	Consultants fees	
100	428	Depreciation - office equipment	
100	431	General expenses	
100	432	Computer expenses	
100	433	Printing services - own	
100	434	Accounting machine centre	
		TOTAL:	
100	441	1,3 General Car expenses	
100	442	Office maintenance	
100	443	Management remuneration	
100	444	Directors fees	
100	445	Company houses	
100	446	Entertainment	
100	447	Overseas travelling	

COST CENTRE CODE	ACCOUNTS CODE	ACCOUNTS DESIGNATION	TOTAL
100	632	Coffee machines	
100	633	Employees welfare	
100	634	Medical services	
100	641	Compound - salaries and wages	
100	642	- soup kitchen & beer	
100	651	- general	
		TOTAL:	
		<u>S U M M A R Y</u>	
		1 Administration services	
		01 Secretarial	
		02 Accounts	
		03 General	
		04 Stores differences	
		TOTAL:	
		2 Works services	
		3 Welfare services	
		TOTAL OVERHEADS:	

COST CENTRE CODE	ACCOUNTS CODE	ACCOUNTS DESIGNATION	TOTAL
100	448	London office	
100	449	Johannesburg office	
100	450	Depreciation - office furniture	
100	451	Miscellaneous	
		TOTAL:	
100	448	1 4 Stores differences	
		TOTAL:	
100	891	2 Works services Drawing office	
100	892	Works security	
100	893	Purchase office	
100	894	Stores area	
100	895	Works insurance	
100	896	Rate charges	
		TOTAL:	
100	601	3 Welfare services Company contributions - pension	
100	603	- medical aid	
100	604	- U I F	
100	605	Workmen's compensation insurance	
100	621	Personnel office expenses	
100	631	Staff training	

As previously stated, the costfinding installation is a purely functional one which applies throughout the undertaking to indirect costs as well as to direct costs. Overhead expenses are therefore allocated and collected functionally per responsibility by means of their accounts code number. The allocation of all costs consequently flows from the source which incurs it, i.e., the organisational point or cost centre where it originates, and the onus of accounting for the item of cost (the accountability) is shifted to the source. To enable this source-control costfinding to function efficiently and effectively, authority commensurate with the responsibility of the function must be delegated to cost centre heads and their deputies. This accountability in itself is a further aspect of psychological control. There is then an accountability for every item of cost relevant to a function and this accountability, whether it be a departmental or sub-departmental head, is in turn responsible to an authority higher up on the scalar chain of command.

A natural advantage that flows from the functional approach of the presentation and collection of all costs is that an in-depth system of budgetary control can be effectively instituted and, as comparison is control, control of the elusive indirect costs such as overheads is facilitated. The system of supplementary budget control in operation at this undertaking is founded on the same functional principles that constitute the basis of the collection, allocation and distribution of the actual expenditure and other transactions of the undertaking.

In the Dunswart Iron and Steel Works, Limited group of companies the principle of reporting only variances from the norm - budget - is applied to overhead expenses as well. Such variances, favourable as well as adverse, are reported on monthly and this report is in the form of a overhead comparison of actual to budget as per annexure 17. Not only are variances for the current month revealed but for the year to date as well. Hence changes in the overhead structure of the undertaking are revealed and any necessary remedial action may be taken practically immediately.

Therefore in costfinding where overheads are classified by, and charged to functional account number codes, the theory that the classification of costs begins with the determination of responsibilities - accountabilities - for cost incurrence applies with equal force to indirect expenses - costs - as to direct costs. But it must always be borne in mind that such a functional system of cost collection, allocation and apportionment has one great disadvantage. Responsibility for costs is not always where it appears to be and is not always easily determined. Costfinding endeavours to eliminate or lessen this disadvantage by, firstly, not actually apportioning indirect costs to production departments or profit centres as is done in a normal cost accounting installation and thus losing the identities of indirect costs in a mass of figures and facts. Instead, costfinding distributes indirect costs of this nature memorandum-wise only and there are no actual entries effected in the financial ledgers to cloud or distort ledger accounts. Secondly, no effort is spared to enforce the company policy of strict adherence to a

...../scientifically

scientifically designed functional organisation chart which even distinguishes between managers and executives. The distinction between managers and executives is that managers are responsible for all classes of cost other than general overhead and that only executives can be responsible for general overhead. Control of general overhead must be initiated at the executive level as it is the chief executive that bears the responsibility for the net profit of the undertaking and the last deduction that determines net profit before taxation is the aggregate of general overhead.

As previously stated in this chapter the overhead referred to is not apportioned or distributed to profit centres by actual entries being effected in the financial ledgers, and as costfinding necessitates no cost ledgers, cost pools nor control accounts, the apportionments are effected on a memorandum basis only which collect and collate all statistics on profit and cost centre statements. These statements are balanced with, but does not form part of the financial ledgers. In the interests of the accounting principles of conservatism and materiality the general overhead referred to in this section is apportioned out only to terminal profit centres. THUS THERE IS NO OVERHEAD ELEMENT INCLUDED IN ANY STAGE OF THE WORK IN PROGRESS THROUGHOUT THE PLANT. IT IS ALL INCLUDED IN THE FINISHED PRODUCTION INVENTORIES.

3 1 3 Basis of apportionment

It is into the basis of the methods of apportionment of overhead that costfinding did some of the deepest research. The reasoning behind, and methods of contemporary cost accounting systems for cost recoveries were fully investigated in an effort to find equitable methods to suit a Steelworks which was a mixture of the old and the new. The growth, geographic dispersion and layout of the Plant with its intermittent expansions of production units and facilities were typical of the entrepreneurs of the period. With increases in the demand for finished steel, additional production facilities were ordered and installed with the utmost speed in order that, whatever the cost might be, production could be stepped up. The result was that the plant in operation was a unusual mixture of labour-intensive old units and capital-intensive new units laid down in an anything but scientific production-flow sequence.

As a result there was the problem of distributing overhead in such a way that both labour-intensive and capital-intensive sections of the plant received their fair share. To accomplish this equitably and quickly, HALF OF THE TOTAL OVERHEAD, EXCLUDING WELFARE AND SIMILAR CHARGES, WAS DISTRIBUTED IN RATIO TO THE TOTAL DEPRECIATION OF THE PLANT FOR THE COST PERIOD, THE OTHER HALF OF THE TOTAL OVERHEAD WAS DISTRIBUTED IN RATIO TO THE TOTAL DIRECT WAGES AND SALARIES OF THE PLANT FOR THE COST PERIOD. ALL WELFARE AND SIMILAR CHARGES WERE DISTRIBUTED IN RATIO TO THE TOTAL DIRECT WAGES AND SALARIES OF THE UNDERTAKING FOR THE COST PERIOD.

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Thus it was ensured that both the labour and the capital-intensive sections of the Plant received an equitable distribution. This method of overhead distribution was also construed by authorities on the German Uniform Costing System to be within the meaning of their system. A standard procedure was drawn up and an apportionment of overhead schedule (annexure 18) was designed which is still in use today.

3 1 4 Why overhead is a problem

In closing this section on overhead, we briefly discuss some of the aspects of the problem of overhead which, although encountered some years ago, are still in general very much the same today.

Controlling overhead costs is a special problem in management. It cannot be delegated like most problems. For one thing, there are no firm criteria to measure how the delegation is to be handled. The difference between enough, too little, and too much is a matter of judgement. Judgement of overhead is greatly influenced by the point of view. The same costs will seem too much to the manager of a profit centre to whom overhead is allocated, and too little to the head of an overhead function who must satisfy demands on his services.

Control of production costs or selling costs is being delegated more or less successfully all the time. Those to whom control is delegated understand how their performance will be judged. They know that they themselves and their superiors will use the same criteria and will interpret them in the same way. The production manager and his superior have a common desire to reduce unit costs. The sales manager and his superior have a like incentive to improve the ratio of selling costs to volume.

The head of an overhead function can be expected to operate within his budget. He and his superior, however, have differing motives. He is interested in supplying more service, counsel, and information to the other departments, and in being a greater influence in the company - in other words, in obtaining a larger budget. His superior, on the other hand, is well aware that overhead is a deduction from profit. He wants to constrain overhead budgets and generate larger profits.

Control of overhead, therefore, is a different problem from controlling production or selling costs. Different motivations and attitudes are at work. It requires a different type of management and control. Supervising the performance of overhead functions requires different skills and standards from those used to evaluate the profitability of profitmaking divisions.

Production men quickly learn from experience, if they have not already learned in theory, how a change in their costs for materials or labour changes their unit costs. They can see the direct relationships that prevail between the costs they control and

...../the

the costs of the things they make. They know that they will be able to measure in their performance figures next month a reduction they make today in crew size or amount of materials consumed. They have learned, in the same direct manner, the effect a variation in volume has on their unit cost figures.

The very disciplines of manufacturing lead to optimisation of the relationships between direct costs and profits. All the thinking of production men is geared to the idea of maximum utilisation of plant. They want to manufacture as much product as possible with the resources available to them. They feel achievement in establishing new records of output. They try to reduce wastage and idle time of men and machines below previous records.

Watching their performance figures has reinforced these disciplines. Production men have learned how their elements of costs, volume, and unit cost are tied together; in a drive to increase output, for instance, they have learned how careless wastage of materials can wipe out part of the anticipated gains in unit cost. They realise that they must trim payrolls as soon as production is cut back, much as they hate to do so.

Even in the area of supporting manufacturing services - auxiliary and service departments - (provided such services are charged to their performance figures) production men see the direct relationship between charges and unit costs. They understand that their performance will look worse if they add an engineer unless he makes compensatory savings in utilisation of plant, labour, or materials. Hence manufacturing services are always looking for ways to reduce the labour content of a product, to get more output from plant, and to lessen materials consumption.

When businesses do get into trouble because of expenses attributable to manufacturing, it is most often because of lack of control over inventory. Overbuying and overproduction and overinvestment in plant effect the financial condition of a company, but they do not affect production performance figures adversely.

In overhead areas, there is no such clear relationship between expenses and profits as exists in production. The effect of manufacturing costs on profits is obvious down to the level of each cost centre; the effect of overhead expenses on profit is apparent only in aggregate. Changes in costs are evident only in the rate of overhead applied, and the reasons for these changes are usually to be found after an intensive investigation. Consequently, personnel in overhead categories have no such direct profit motivation as exists in manufacturing. No company, furthermore, adds an executive, an accountant, or a research scientist with the expectation that he will effect compensatory savings in overhead to improve profits next month. Whereas a production engineer may be added in the expectation that he will find ways to eliminate the need, say, for three machine operators, there is no thought that an additional executive will save his salary in clerks. As we all know, quite the reverse is likely to be the case; he, in turn, will tend to raise other overhead expenses.

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The justification for hiring a production engineer is to reduce costs. In adding an executive, an accountant, or a research scientist, it is obvious that overhead costs will be increased, not reduced. Consequently, the justification here has to be that the growth pattern of the company is such that an increase in total overhead will not increase the overhead rate. When total overheads increase faster than sales, this increase can only be at the expense of profits.

Control of general overhead must be initiated at the executive level. In the eyes of shareholders, responsibility for net profit rests on the chief executive, and the last deduction that determines net profit before taxes is the aggregate of general overhead.

Control of general overhead cannot be delegated away to managers of overhead costs centres because the chief executive has the final responsibility for balancing the expenditures of functions so that their aggregate is not an excessive deduction from profit. Control of production costs can be delegated to the level of cost centres, but control of overhead can be delegated to functions only after total overhead is controlled. These amounts, in turn, can be broken down to functions for control and measurement of the expenses of functional units.

With this relationship between aggregate overhead and profit, there is a widespread tendency to justify overhead as a percentage of sales. As a consequence, those in charge of overhead functions tend to support their costs in terms of a percentage of sales. It is quite common for individual companies to report, for instance, the percentage of sales going into advertising or research.

Such thinking, however, is just the opposite to that of the production man. He is looking for ways to reduce costs of manufacture and to lower his unit costs. The manager of an overhead function is looking for ways to maintain a ratio of overhead expenses to sales. Efforts of the former increase profits while those of the latter tend to freeze profit margins in growth situations and to reduce them in declining markets.

Indeed, for many companies the so-called cost-price squeeze is a misnomer. More properly, they are in an overhead-profit squeeze. This fact is borne out if manufacturing cost and overhead are plotted in relation to sales over a number of years. It is likely to be the case that overhead expenses increase more rapidly than sales, thereby eroding profit margins.

In general, overhead expenses do not relate to volume as they are expected to. In theory, overhead should decline, as a ratio of sales, when volume increases. For most companies, however, the long-term trend is not towards a smaller percentage, in spite of general growth. This is equivalent to saying that we have not learned how to operate more efficiently in overhead areas with increasing size. Any comparison of large with small companies in the same fields will support this conclusion. The smaller companies will have relatively lower overheads, although they may also have relatively higher manufacturing costs.

...../Other

3 2 Other indirect costs

3 2 1 General

This division of the costfinding installation in the Dunswart Iron and Steel Works, Limited group of companies comprises all indirect costs other than the overhead aspect discussed in section 2 above. To comply with the principles of costfinding it is necessary that all these indirect costs must be grouped and treated as cost centres and each cost centre must be treated as a separate entity - an entity that must be capable of being controlled in the same manner as if it were a production unit. An indirect cost centre can therefore be a division, a department or subdivision thereof, a group of machines or of men or of both, a single machine and its operating force, or any other unit of activity into which a manufacturing plant and its operation is divided for purposes of cost assignment and allocation.

The performance of a cost centre must also be capable of being measured in terms of its cost and output whether such output be in terms of intangible units of service or some tangible unit. In the cost centre's periodic performance reports (operating statements), the cost of the quantities produced in the cost period is stated, normally, as an average unit cost. This unit cost and its composition are invaluable indices of performance, both to the immediate managers of the cost centres and to their superiors. By this means, an objective indicator of performance is obtained, and managers at all levels have a common understanding of its meaning and importance. Because of the value of such performance (operating) reports, they are an important aspect of management control, and much attention has been given to increasing their significance. As with all the other aspects of costfinding, applicable to overhead and other indirect costs as well as to direct costs, all elements and components of expense are treated on a functional basis. Indirect costs are therefore classified by, and charged to, functional organisational units. The theory that the classification of costs begins with the determination of responsibilities of cost incurrence applies equally to indirect costs as to other costs. This is so even though the responsibility for such costs is not always where it appears to be and is usually not easily determined.

One very important aspect of costfinding is that only in the case of direct costs are cost centre codes used. In all indirect costs the relevant account number code is the functional collection point. In this instance the account number code is prefixed by the cost centre code 100 to indicate that the

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amounts represented by the account number code are not to be charged direct to production. This type of functional collection of indirect costs has one great disadvantage and that is that individual items are lost in the final accumulated bulk of the data and statistics. This disadvantage is however offset by a system of accounts analysis, in true audit tradition, of all such account numbers. Refer annexure 19.

By doing this a substantial amount of work on the part of the external auditors is eliminated as their test check practically becomes a matter of routine and extraction. The hypothetical aspects of these analyses are understood by the management of the undertaking and any disadvantages that may arise from the need for compiling these schedules are far outweighed by their usefulness.

3 2 2 Controllable and uncontrollable indirect costs

The term indirect costs, as used in cost accountancy, means essentially any charge which cannot be attributed exclusively to a single saleable product or service. Costs which must be apportioned or allocated to several products or services are in this category whether applied, for cost accounting purposes, before or after manufacturing costs.

When we look at indirect costs from the point of view of management, however, we see that cost accounting practices are not always precisely relevant. Many line items of indirect costs cannot be ~~managed~~ in any usual sense of the word. Neither executives nor managers can control them; the amount of such items cannot be increased or decreased by the management of the internal organisation. Such items, for example, are royalties, paid and received, and commissions, paid and received. The amounts of these items are properly a charge to indirect costs. Management is ~~responsible~~ for them. By legal or other action management may be able to influence them favourably. Nevertheless these charges are by no means subject to the same sort of management review, analysis and control as are many other items of indirect cost.

By way of contrast, such an item as maintenance engineering in the plant is a ~~manageable~~ category of expense. It can be reviewed, analysed, budgeted and controlled by appropriate managers. It can even reflect the ability of managers to stimulate superior performance in subordinates so that the function can be performed more effectively; hence the amount charged to maintenance engineering expense is truly a controllable charge. Thus costfinding accepts that there are controllable and noncontrollably indirect costs. In brief, any charge imposed by a regulatory body or made to fulfil a longterm contract can be considered in the sense used here. Such charges are not subject to normal managerial review, control, or internal action, even though management retains responsibility and must continue to scrutinise them.

All other categories of indirect costs can be regarded as controllable. However, they are not all subject to the same type of managerial control, and they can be managed at different organisational levels. Even though the same principles of control will apply to them all, it is well to distinguish between them.

At first glance controllable and uncontrollable costs as the terms are used here may be confused with the fixed and variable costs of cost accountancy. A fixed cost is an expenditure that does not vary with volume, i.e., IT IS FIXED PER UNIT OF TIME. A variable or semi-variable cost is an operating cost of a class that vary directly, sometimes proportionately with production, i.e., IT IS FIXED PER UNIT OF PRODUCTION. The distinction that costfinding draws here is between costs that management has some chance of improving and those it can scarcely hope to do much about. As we are concerned with controlling indirect cost, attention focusses on areas of indirect cost where control can be more fruitful.

Based on these hypotheses, costfinding makes the distinction between managers and executives. Although, as previously stated, managers may be responsible for any and all classes of cost, only executives can be responsible for general overhead.

As costfinding is control by responsibility (accountability) this type of expense is brought into the profit system only at the executive level; that is to say, responsibility for its gross effect on profit is unified in the executive. No subordinate cost centre can be held responsible for indirect costs beyond its control - for example, the salary and expenses of the chairman of the undertaking. Costfinding therefore requires that indirect costs can only be charged to subordinate cost centres on the basis of actual use; PROVIDED however, that the subordinate manager has in fact complete control over such use in the same way as his other costs. If he is not equally free to use or not to use competing outside services, any responsibility attributed to him for parts of indirect cost is fictional to a degree. This dictum of costfinding, that only controllable cost should be charged to cost centres, is another reason, beyond the two that has already been mentioned, why overheads are apportioned only to profit centres.

From all these considerations, then, it is apparent that controlling indirect cost is a special problem. It should not be approached in the same way as in controlling manufacturing costs. Too often, management waits until the indirect costs-profit squeeze becomes critical before acting. Under such conditions the -meat axe- is used, and a general directive is issued to cut all departments by a set percentage. In the process, fat is trimmed where it exists, but blood is drawn, also, in areas where the tendency to build empires has been resisted. It is not necessary to wait to control indirect cost, but it is a very difficult thing to accomplish on any organised and consistent basis. Nevertheless, there is no management activity more related to profit making.

3 2 3 The incidence of service and auxiliary departments on the cost structure

Koontz H and O'Donnell C (1955) op cit, page 173 amplifies the concept of a service department as being quite distinct from that of either a so-called line or staff department. Such terms as -service- -facilitating- -auxiliary- and, more simply, -aid- have been employed to convey the nature of these activities. A service department does sometimes facilitate the operation of line and staff and other service departments; it is correct to view some auxiliary activities as contributing to the efficiency of all other departments; and it is proper to say that service departments both serve and aid other grouped activities. In addition, it is important to recognise that service departments represent GROUPING OF ACTIVITIES and thus involve the performance of an operating function. Line and staff, on the other hand, are organisational names given to two kinds of authority relationships. A further distinction between the service department and other types relates to the occasion for its appearance.

At the Dunswart Iron and Steel Works, Limited, as in all other largescale production units, there are cost-intensive service departments which materially influence the cost structure of the undertaking. These are the indirect cost centres whose costs cannot be directly charged to any one specific process or product, but only apportioned out on some equitable basis to the profit or cost centres that they serve.

As indirect costs are apportioned out to, and absorbed into, manufacturing (direct) costs, they are literally hidden costs. At best, in normal circumstances, such indirect costs are shown as a part of the unit cost of the finished steel.

At Dunswart Iron and Steel Works, Limited, for the month of July, 1974, maintenance costs alone amounted to approximately twenty-five per cent of the total cost of steel manufactured. In view of the magnitude of this it is essential that as rigid a source control be enforced on latent (indirect) costs of this nature as is applied to any manufacturing (direct) costs. Costfinding principles therefore require that, not only on total cost centres are all components of cost shown, but further that there must be sub-cost centres compiled for all latent (indirect) costs.

A problem is encountered where there are production processes and units which do not produce a finished product in itself, but only feed, i e, are supplementary or auxiliary to, the main manufacturing process. Examples of this type of supplementary production unit are the gas producer and the water reticulation system.

In the Dunswart Iron and Steel Works, Limited group of companies costfinding has adopted a new approach to this problem. To ensure that other departments are subjected to management control in the same way as all the manufacturing processes of the Plant, they are divided into two functional groups, viz, the service departments which consist mainly of the workshops responsible for the maintenance function as a whole and which report to the chief engineer, and the auxiliary departments which cover the supplementary units mentioned above.

For control purposes costfinding treats them both as indirect cost. For tributary purposes of cost collection and allocation, all the functions in the two groups are divided into cost centres

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within each group, and the sum of the costs is then apportioned out to the user cost or profit centre.

The individual cost centre grouping for these two categories of indirect cost is as follows:-

1 Service departments - workshops

	<u>COST CENTRE CODE</u>	<u>ACCOUNT NO. CODE</u>	<u>FUNCTION</u>	<u>COST STATE- MENT NO</u>	<u>DUNSWART LINE NO</u>
i	100	864	Workshop - blacksmiths	C 08 etc	38
ii	100	865	- bricklayers	C 08 etc	38
iii	100	866	- carpenters	C 08 etc	38
iv	100	867	- electricians	C 08 etc	38
v	100	868	- fitters	C 08 etc	38
vi	100	869	- greasers	C 08 etc	38
vii	100	870	- machine shop	C 08 etc	38

2 Auxiliary departments

	<u>COST CENTRE CODE</u>	<u>ACCOUNT NO CODE</u>	<u>FUNCTION</u>	<u>COST STATE- MENT NO</u>	<u>DUNSWART LINE NO</u>
i	100	184	Gas producer	100/184	*811 9
ii	100	810	Sasol gas	C 08 etc	8
iii	100	811	Gas producer tariff	C 08 etc	*184 9
iv	100	814	Oxygen	C 08 etc	11
v	100	816	Heating current	C 08 etc	14
vi	100	819/820	Water reticulation	C 08 etc	17
vii	100	823	Roll turning	D 21	21
viii	100	826	Propane gas	E 2	19
ix	100	841	Cranes - overhead		

	<u>COST CENTRE CODE</u>	<u>ACCOUNT NO CODE</u>	<u>FUNCTION</u>	<u>COST STATE- MENT NO</u>	<u>DUNSWART LINE NO</u>
x	100	842	Works transport)		
			)		
xi	100	843	Mobile handling)	C 08 etc	28
			equipment)		
			)		
xii	100	844/5	Test, analysis trials	C 08 etc	29
xiii	100	846	Straightening and grinding	D 21	26

As an illustration of the permeation of this indirect cost throughout the plant we extract hereunder the cost centre statement number C 08 for the melting department. Following up the Dunswart line number quoted above to the relevant Dunswart line number on the cost statement, it becomes apparent that the matching concept of cost incurred and the reporting thereof is standardised throughout the costfinding system.

DUNSWART IRON AND STEEL WORKS, LIMITED

MELTING DEPARTMENT

C.08

Line		Acct. Code	COST ACCOUNT		Unit	Un C
Dunswart	German					
			a	b		
1	1	801/2	Direct Labour			
2	3	803	Auxiliary Wages			
3	5	804	Overtime Premium			
4	6	805	Paid Holidays			
5	7	806	Salaries			
6	8	807/8	Statutory Deductions			
7	11		Total Personnel Costs			
8	12	810	Sasol Gas			
9	13	811	Producer Gas Tariff			
10	14	813	Fuel Oil	Litre		
11	16	814	Oxygen	kg.		
12	17		Total Fuel			
13	18	815	Graphite Electrodes	kg.		
14	19	816	Melting Current	1000 kwh		
15	20	817	Electricity	1000 kwh		
16	22	818	Compressed Air			
17	24	819	Water			
18	27		Total Power			
19	28	821	Moulds and Appliances			
20	29	831	Furnace Brick	kg.		
21	30	832	Ladle Brick	kg.		
22	31	833	Roof Brick	kg.		
23	32	834	Dolomite	kg.		
24	33	835	Other Refractory Material	kg.		
25			Total Refractory Materials			
26	36	825	Operating Material			
27		840	Mass Spectrometer			
28	38	841-3	Other Transport Costs	Hour		
29	39	844/5	Tests, Analysis, Trials			
30	40	847	Irrecoverable Costs due to Scrap Returns Etc.			
31	43	848/9	Miscellaneous Operating Costs			
32	44	850	Miscellaneous Credits			
33		888	Fume Cleaner/Scrap Preheater			
34	45		Total Other Operating Costs			
35	47	851	Furnace Lining Tariff			
36	48	861	Own Maintenance Labour			
37	49	862	Maintenance Material			
38	50	864-70	Workshop Operating Rates	Hour		
39	54	863	Spare Parts			
40	55	872	Maintenance by Outside Contractors			
41	56	873	Maintenance Tariff			
42	57	886	Credit for Repair Scrap			
43	58		Total Plant Maintenance			
44	60	890	Depreciation			
45	61		Interest			
46	63		Total Capital Charges			
47	64		Share of Joint Operating Costs (Line 1 - 46)			
48	65		Specific Processing Costs of Department			

The aspects of other indirect cost and its classification into service and auxiliary departments in the undertaking have briefly been discussed. In order to illustrate the actual operation and control of these components of indirect costs, we will now discuss them in greater detail in their designated groupings.

a Service departments

McKinsey (1970) page 126 states that with recent advances in mechanisation and automation, maintenance is becoming an ever more important factor in overall cost and effectiveness. In a company that can sell all it produces, the impact of maintenance on profitability will obviously be substantial, but even in companies with excess capacity, downtime can cause a sizable increase in costs. Related to this impact, of course, will always be the effects of maintenance on product quality, scrap, and raw material waste.

cf McKinsey - An Anthology - The arts of top management - McGraw-Hill London 1972

As previously stated the departments that comprise the maintenance function of the Plant consist of:

i	Account No 100/864	Workshops - blacksmiths
ii	Account No 100/865	- bricklayers
iii	Account No 100/866	- carpenters
iv	Account No 100/867	- electricians
v	Account No 100/868	- fitters
vi	Account No 100/869	- greasers
vii	Account No 100/870	- machine shop

Each department reports to the engineer of the undertaking on the scalar chain of command. Each department has its own internal chain of command. There is a foreman responsible for the operation of the shop and there is an allocated number of European and Bantu employees to perform the necessary tasks and to operate the machines of the department. At the end of July, 1974 the daily paid personnel complement of the maintenance function (account numbers 864 - 870) was

i	195 European i e 43% of the total complement
ii	371 Bantu i e 25% of the total complement

Foremen in these service departments, as with foremen in all the other sectors of the Plant, are considered as supervision. Accordingly they are staff, remunerated on a monthly basis and excluded from the personnel statistics quoted for these departments. Cost for each department is collected functionally. The total number of hours worked for each department is accumulated as an automatic by-product of the computerised payroll. The total cost of each department is then known as well as the total hours worked. Therefore the unit of cost collection is on a hourly basis. The hours worked on outside profit and cost centres are also automatic by-products of computerised timekeeping based on the hours recorded by each shop.

At first sight it would now appear the logical thing to do to build rates into the computer programme and to distribute evaluated hours (totals) to user departments and, by so doing, to obviate the further necessity for clerical computation. The conversion

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of overtime hours to extended normal hours presents no difficulty as this is included in the computerised by product aspect of timekeeping. Therefore the equating of time spent at the various overtime rates for user department's chargeouts would present no problem. All in all the unit of chargeout, the hour, is available. But in precalculating the rate the following difficulties arise:

- a Costfinding principles require that the cost of all operations for a cost period (month) be actual. This is so in order that untoward factors can be highlighted in the period that they occur. Therefore standard costing variance accounts would, *inter alia*, tend to smoothe and automatically hide such untoward factors until such time as variance accounts were analysed.
To wait for such variance account analyses before remedial action is taken can be dangerous, particularly in an industry where selling prices are controlled (fixed) and where an untoward variance is multiplied many thousands of times in large scale production runs.

- b The total cost of service departments and the hours worked can vary substantially from period to period. Here it must however be pointed out that the variances in the operating cost of service departments are lessened considerably when expensive spare parts and other direct maintenance materials are no longer charged to the service department that requisitioned them.
Instead these items are charged direct to the user (consumer) profit or cost centre. This results in a service department requiring less clerical labour. On the functional basis instituted at the undertaking, the only materials that are now charged to service departments are those that are consumed in the direct operation of that service department e.g., waste, grease, etc.

- c The hours spent by the apprentices in each service department whilst undergoing technical and theoretical training at technical colleges is material. Were evaluated shop hours charged for this time away, which has to be paid for, training costs would become prohibitive. Costfinding principles consider this cost of training to consist only of the sum of the hourly amounts actually paid to the apprentices whilst undergoing such training.
The wages in respect of these paid training periods are therefore included in the operating costs of the service department concerned and recovered accordingly as a part of the total operating cost that is apportioned out to user profit or cost centres on the basis of the hours actually worked for them. Training costs are therefore borne at cost by the service department concerned.
This is accordance with the theory that it is the service departments which benefit from this apprentice training. Evaluated shop hours are therefore not chargeable to training costs.

- d The ageold cost accounting problem of the calculation and treatment of costs where service departments serve each other as well as other profit or cost centres is a manifestation which is encountered in every organisation. As the size of an undertaking grows and its production volume increases so does this problem intensify until it reaches alarming proportions, and the classical methods of treatment advocated by the exponents of cost accountancy, which are at best cumbersome, are completely unworkable. Another solution had to be found, a solution that complied, with normal cost accounting principles, and in accordance with costfinding techniques allows rates of recovery yet leaves no under- or over-recovered balances on the total cost centre accounts of service departments. The solution propounded by costfinding to this problem is a simple, yet relatively equitable one. The cost collection and apportionment schedules for these service departments are

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divided into two sections - refer annexure 20. The first half consists of the areas wherein they can serve each other.

The previous period's average hourly cost recovery rate is applied. The resultant balance, after adjustment of transfers from and to other service departments within the group based on a rate compiled from actual hours worked and the previous period's average rate, is then the total cost of each service department (cost centre). This is then charged out to the profit and cost centres it has served at a rate compiled from actual hours worked and actual cost. In fact, a true workshop hour rate has been used for work done in other areas. Experience over the years that this method of cost apportionment has been in operation in this undertaking has proved that the previous month's average shop hour rate and the actual cost for the current period have never varied materially.

The methods of cost collection, apportionment (recovery) and control advocated by costfinding is relatively simple yet effective. The objectives and the concept of costfinding can be closely identified with the following doctrines:

- i Scientific management control - internal control
- ii Disclosure - the maximum disclosure of all material and relevant facts
- iii Comparison-
 - a as control - budgets, forecasts etc
 - b with the similar facts, figures and statistics of the preceding period and year to date
- iv Comparability - that all similar facts, figures and statistics are strictly comparable. If this is not the case then, if in no other way, attention must be drawn hereto by way of a note
- v Responsibility - in the functional sense
- vi Control at the source of an entry or transaction
- vii Materiality - the full disclosure of essential information so that statements present fairly the financial condition and operating results of the undertaking
- viii Consistency - the application and construing of all the basic principles of accounting, cost accounting and costfinding on a basis consistent with that of the preceding period. And by so doing to avoid any distortions of the financial results of the operations of the undertaking.

To illustrate the basis for the collection, allocation and apportion of costs we append hereunder the standard total cost centre statement for blacksmiths - account number 864, which is representative of all the monthly total cost centre statements for Service Departments.

DU'YSWART IRON AND STEEL WORKS, LIMITED

SERVICE DEPARTMENT COST CENTRE STATEMENT AS AT

WORKSHOPS - BLACKSMITHS - A/C 864

	<u>Last Month</u>	<u>This Month</u>
Salaries	_____	_____

European Wages	_____	_____
- Leave Pay	_____	_____
Bantu Wages	_____	_____
-Leave Pay	_____	_____
Gas Producer	_____	_____
Depreciation	_____	_____
Stores	_____	_____
Service Department Charges	_____	_____
- do -	_____	_____
Power	_____	_____
Compressed Air	_____	_____
Water and Water Reticulation	_____	_____
	_____	_____
	_____	_____
Per Distribution	_____	_____
<u>LEDGER PROOF</u>		
Closing Balance	_____	_____
<u>Less:</u> Opening Balance	_____	_____
	_____	_____
<u>Add:</u> Back Transfers	_____	_____
	_____	_____
	_____	_____
Amount Distributed	_____	_____

To close this section on service departments without briefly illustrating its monthly reporting aspect would not do justice to costfinding. We therefore append hereunder for the month of July, 1974 the following extracts of the cost statements:

- a Total cost centre statement W 01 - workshops
b sub cost centre statement W 02 - workshops

(a) Total cost centre statement W 01 - workshops

DUNSWART IRON AND STEEL WORKS, LIMITED

TOTAL COST CENTRE STATEMENT - WORKSHOPS

W.01

Line	Acct. Code	COST ACCOUNT	This Month	Previous Month	Year to Date
1	801-2	Direct Labour	105 585	91 602	695 901
2	803	Auxiliary Wages			
3	804	Overtime Premium	16 692	17 058	104 939
4	805	Paid Holidays	10 104	8 967	61 973
5	806	Salaries	16 853	15 957	106 663
6	807-8	Statutory Deductions	656	670	4 264
7		Statutory Company Contributions			
8		Total Personnel Costs	149 890	134 254	883 740
9	810	Sasol Grs			
10	811	Producer Gas Tariff			
11	813	Fuel Oil			
12	814	Oxygen			
13		Total Fuel Costs			
14					
15	817	Electricity	215	280	4 702
16	818	Compressed Air	1 355	1 392	17 564
17	819-20	Water	142	73	729
18		Total Power Costs	1 713	1 745	22 995
19	156	Operating	1 431	2 042	11 570
20	156	Other	2 465	2 219	13 739
21		Total Material Costs	3 897	4 262	25 309
22	841-3	Transport Costs	823	455	2 639
23	843-9	Miscellaneous Operating Costs	2 704	1 326	20 793
24	850	Miscellaneous Credits			
25					
26		Total Other Operating Costs	3 532	1 781	23 482
27	354	Blacksmiths			
28	355	Bricklayers			
29	356	Carpenters			
30	357	Electricians			
31	358	Fitters			
32	359	Greasers			
33	370	Machine Shop			
34					
35					
36					
37					
38					
39					
40					
41					
42		Services Rendered			
43	890	Depreciation	457	437	3 052
44		Interest			
45		Total Capital Charges	457	437	3 052
46		Operating Costs of Department	159 539	142 469	958 578
47		Less Costs Apportioned Out	43 428	39 230	268 841
48		Applicable to Production Departments Per Cost Centre Statements	116 111	103 239	689 737
		Hours worked:	39 676	37 351	268 003
		Hours Spent in Own Department:	547	882	4 562
		Hours Available:	40 223	38 233	272 565
		Tariff Per Hour:	R4,02	R3,81	R3,58

b Sub-cost centre statement W 02 - workshops

DUNSWART IRON AND STEEL WORKS, LIMITED

SUB-COST CENTRE STATEMENT - Workshops

W.02

Line	Acct. Code	COST ACCOUNT	BLACKSMITHS		BRICKLAYERS		CARPENTERS		ELECTRICIANS	
			This Month	Previous Month	This Month	Previous Month	This Month	Previous Month	This Month	Previous Month
1	801-2	Direct Labour	4 806	3 502	7 573	6 412	3 846	3 034	26 792	24 178
2	803	Auxiliary Wages								
3	804	Overtime Premium	504	421	1 237	1 210	473	577	4 295	4 381
4	805	Paid Holidays	435	335	713	669	357	307	2 657	2 327
5	806	Salaries	812	823	2 121	1 697	814	821	5 669	5 448
6	807-8	Statutory Deductions	31	31	8	23	39	23	172	172
7		Statutory Company Contributions								
8		Total Personnel Costs	6 588	5 113	11 652	10 711	5 529	4 762	39 585	36 508
9	810	Sasol Gas								
10	811	Producer Gas Tariff								
11	813	Fuel Oil								
12	814	Oxygen								
13		Total Fuel Costs								
14										
15	817	Electricity	75	54			13	54	38	27
16	818	Compressed Air	1 043	910						
17	819-20	Water	142	73						
18		Total Power Costs	1 260	1 037			13	54	38	27
19	156	Operating	1 431	2 042						
20	156	Other	873	645	241	200	183	484	77	124
21		Total Material Costs	2 304	2 687	241	200	183	484	77	124
22	841-3	Transport Costs	344	129	312	135	32	30	75	99
23	848-9	Miscellaneous Operating Costs	105	76	332	187	37	42	724	520
24	850	Miscellaneous Credits								
25										
26		Total Other Operating Costs	449	205	644	323	69	72	299	619
27	864	Blacksmiths								
28	865	Bricklayers								
29	866	Carpenters			28		*/. 124	*/. 176	95	59
30	867	Electricians	100	120		32		59	*/. 259	*/. 687
31	868	Fitters		3					33	
32	869	Greasers	103							
33	870	Machine Shop								
34										
35										
36										
37										
38										
39										
40										
41										
42		Services Rendered	203	123	23	32	*/. 124	*/. 117	*/. 130	*/. 628
43	890	Depreciation	72	72	63	63	4	4	35	35
44		Interest								
45		Total Capital Charges	72	72	63	63	4	4	35	35
46		Operating Costs of Department	10 937	9 237	12 628	10 629	5 674	5 259	40 404	36 683
47		Less Costs Apportioned Out	5 065	2 795	839	715	3 254	2 686	10 959	11 545
48		Applicable to Production Departments Per								
49		Cost Centre Statement	5 872	6 442	11 789	9 915	2 420	2 573	29 435	25 138
50		Hours Worked	1 130	803	198	263	1 210	803	12 435	11 979
51		Hours Spent in Own Department			73	234			36	14
52		Hours Available	1 130	803	271	502	1 210	803	12 471	11 993
53		Tariff per Hour	R9,68	R11,50	R63,66	R39,66	R4,69	R6,55	R3,25	R3,06

Finally, it is submitted that the functioning of the three aspects of costfinding, i e, recording, controlling, all finally culminating in the reporting aspect, has been aptly demonstrated and proved in one of the most problematic indirect areas of an undertaking - service departments!

b Auxiliary production departments

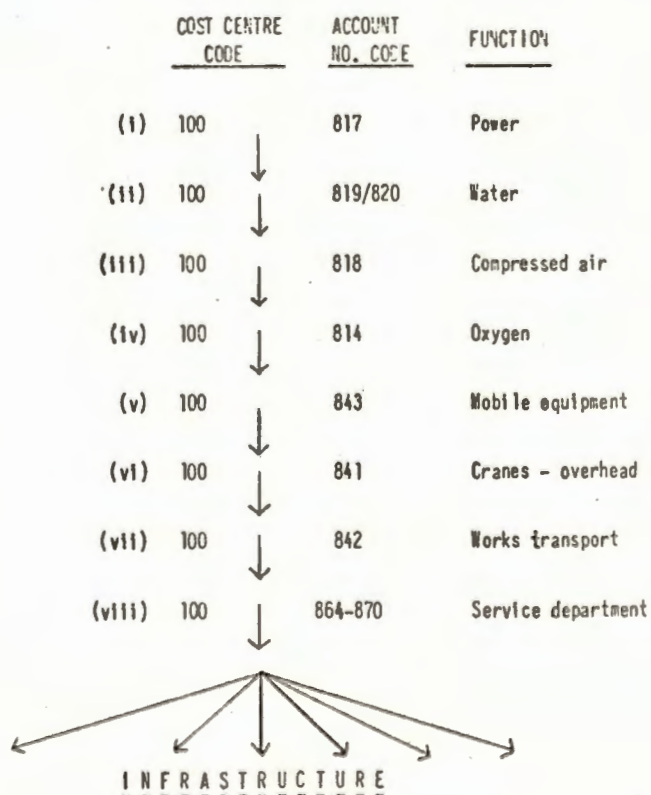
As set out on page 7 149 there are thirteen auxiliary departments. In the Dunswart Iron and Steel Works, Limited group of companies each one of these auxiliary departments is in itself, a production cost centre. Each one produces a commodity or service that is in turn an essential part of the production process.

Yet the product or service of each one flows and is consumed through the entire Plant e g, heating current. Each one is an independent cost centre with its own direct and indirect labour. The cost finding principles of cost collection, allocation and apportionment applied throughout the Plant, as illustrated in section (a) service departments, apply with equal force to these auxiliary departments as well. However, as the final unit of output differs from the auxiliary unit, the basis of apportionment differs as well.

The cardinal rule of costfinding that all costs for a period be actual costs, and that there should be no under- or over-recovered balances in the relevant functional ledger accounts (cost centres) is equally important to this section of the operations of the plant. But although the methods of collection, allocation and apportionment of the cost incurred in the operation of these auxiliary departments are similar to those of the service departments, there are two main differences which can be briefly summarised as follows:-

- a In this grouping of indirect cost centres there are no estimates, i e, interdepartmental charges at previous month's average.

This has been obviated firstly by the nature of these auxiliary departments, and secondly, by the order of these interdepartmental apportionments which has been so arranged that there is a downstream apportionment only. The order of the apportionment sequence is as follows:-



- b The scalar chain of command and responsibility does not flow back to only one line executive as is the case with the service departments. In respect of the auxiliary production departments there are line and staff executives responsible for each function. Due to these differences, together with the fact that the unit of the output of each auxiliary production department is completely dissimilar, it is not advisable to discuss this section collectively, as was the case with the Service departments. Instead we shall briefly discuss each Auxiliary Department on its own.

a Department of Energy

This function consists of six cost centres with one line manager responsible for them. These six cost centres comprise the following:

	<u>COST CENTRE CODE</u>	<u>ACCOUNT NO CODE</u>	<u>FUNCTION</u>
i	100	817	Electricity
ii	100	819/820	Water reticulation
iii	100	184/811	Producer gas
iv	100	810	Sasol gas
v	100	814	Oxygen
vi	100	818	Compressed air

These cost centres, although grouped as one responsibility, are treated as six individual cost centres for costfinding and control purposes. Cost is still allocated, collected and apportioned to them individually in the normal way. In turn the total cost of each cost centre is recovered in the tangible or intangible services that it renders to user profit or cost centres.

As these indirect cost centres are treated as separate entities in the costfinding installation in the undertaking they must be briefly reviewed individually viz:

i 100/817 Electricity

a Responsibility

This cost centre is responsible for the main distribution, the main substation and the works substations, cables, cable trenches and transformers. This cost centre must ensure that the Plant receives a sufficient steady and smooth supply of power.

b Personnel

The cost centre personnel consists of one foreman, one electrician

two handymen and three Bantu.

c Memorandum total cost centre statement

DUNSWART IRON AND STEEL WORKS, LIMITED

WORKINGS RE MONTHLY STATEMENTS

19

WORKSHOPS AND AUXILIARIES

ELECTRICITY - A/C 817

	<u>Last Month</u>	<u>This Month</u>
Total charge	_____	_____
<u>Add:</u> Overheads viz:		
Depreciation	_____	_____
Stores	_____	_____
Service Dept. Charge	_____	_____
	_____	_____
Per Distribution	_____	_____
<u>Ledger Proof</u>		
Closing Balance	_____	_____
<u>Less:</u> Opening Balance	_____	_____
	_____	_____
<u>Add:</u> Back Transfers	_____	_____
	_____	_____
	_____	_____
Amount Distributed	_____	_____

d Unit and method of distribution

The unit of apportionment of the cost of this cost centre is the kilowat hours of power consumed by all user profit and cost centres. The total cost of this cost centre as per the memorandum total cost centre statement is the amount that is distributed.

The number of kilowat hours of power consumed by each profit and cost centre throughout the Plant is calculated from meters installed at point of usage. These meters are read at the end of every cost period by a member of line management and recorded on a standard schedule which is forwarded to the accounts department - refer annexure 21 attached. This standard schedule constitutes the basis of the memorandum compilation to ascertain the allocation of the units consumed on which total cost is calculated and apportioned.

11 100 819/820 Water reticulation

a Responsibility

This cost centre is responsible for the water reticulation of the Plant. Its responsibility commences at the points of intake i e, the Municipal water meters, and ends at the release of waste water into the Municipal water drain, alternatively into the sewerage water system.

This cost centre is not responsible for the water reticulation in the various production units but takes care of the circulation of the required amount, pressure, chemical composition and cleanliness of such water. It is assisted by the laboratories who issue daily analyses of all water in circulation.

b Personnel

The cost centre personnel consists of one chargehand, one handyman, two operators and fourteen Bantu.

c Memorandum total cost centre statement

Refer page continued

c Memorandum total cost centre statement

DUNSWART IRON AND STEEL WORKS, LIMITEDWORKINGS RE MONTHLY STATEMENTS19WORKSHOPS AND AUXILIARIESWATER AND WATER RETICULATION - A/C's 819 - 820

	<u>Last Month</u>	<u>This Month</u>
European Wages	_____	_____
- Leave Pay	_____	_____
Bantu Wages	_____	_____
- Leave Pay	_____	_____
Depreciation	_____	_____
Stores	_____	_____
Service Department Charges	_____	_____
Water and Water Reticulation	_____	_____
Power	_____	_____
	_____	_____
	_____	_____
Per Distribution	_____	_____
<u>Ledger Proof</u>		
Closing Balance	_____	_____
<u>Less: Opening Balance</u>	_____	_____
<u>Add: Back Transfers</u>	_____	_____
	_____	_____

d Unit and method of distribution

The unit of apportionment of the cost of this cost centre should be per thousand cubic meters of water reticulated. The flow i e, usage of water reticulated throughout the Plant would then require to be measured by meters situate at the input point of each production unit.

Such a meter installation throughout the Plant would be costly indeed. Even then it could be debatable whether the results achieved would warrant the expenditure. At Dunswart Iron and Steel Works, Limited when the costfinding system was installed there were no funds available for meters. As a compromise, in the interests of economy, and in accordance with the principles of costfinding, a line manager estimated the consumption of reticulated water throughout the Plant on a percentage basis. When necessary this estimate is updated and revised. The total cost of this cost centre as per the memorandum total cost centre statement is the amount that is distributed on an estimated usage or consumption basis. To illustrate this principle we tabulate hereunder the current estimated percentage distribution:

<u>A/C NO.</u>	<u>%</u>	<u>AMOUNT</u>
100/818	2,0	_____
100/864	<u>0,5</u>	_____
	2,5	_____
100/633	7,0	_____

AUXILIARY PLANT

Cost Centre Code

320	3,0	_____
330	5,0	_____
412	2,0	_____
421	1,0	_____
422	2,0	_____
423	2,0	_____
441	1,0	_____
442	1,0	_____
451	1,0	_____

456	3,0	_____
460	1,0	_____
502	3,0	_____
503	30,0	_____
504	30,0	_____
505	<u>25,0</u>	_____
	<u>100,0</u>	_____

iii 100 184/811 Producer gas - own plant

a Responsibility

This cost centre is responsible for:

Selecting, ordering, storing, beneficiating and supervising the quality of coal for the gas producers and the compound -

The manufacture of producer gas of a high quality at the required pressure for the various applications in the works

Disposing of the various by-products such as ash, screened out fine coal, phenolic water, oil and pitch.

Keeping records of producer conditions, gas quality, gas produced, coal consumed and of untoward factors which will necessitate action by the maintenance department, etc.

b Personnel

The personnel of this cost centre consists of a gas plant superintendent, one chargehand, three operators and thirty-nine Bantu.

c. Memorandum total cost centre statement

Continued on following page

c Memorandum total cost centre statement

DUNSWART IRON AND STEEL WORKS, LIMITEDWORKINGS RE MONTHLY STATEMENTS19WORKSHOPS AND AUXILIARIESGAS PRODUCER - A/C 784

	<u>Last Month</u>	<u>This Month</u>
Salaries	_____	_____
European Wages	_____	_____
- Leave Pay	_____	_____
Bantu Wages	_____	_____
- Leave Pay	_____	_____
Depreciation	_____	_____
*Stores	_____	_____
Power	_____	_____
Water and Water Reticulation	_____	_____
Service Department Charges	_____	_____
- do -	_____	_____
Per Distribution	_____	_____
<u>Ledger Proof</u>		
Closing Balance	_____	_____
<u>Less:</u> Opening Balance	_____	_____
	_____	_____
<u>Add:</u> Back Transfers	_____	_____
	_____	_____

* Raw materials, coal, etc

d Unit and method of distribution

The unit of apportionment of the total cost of this cost centre, as per the memorandum total cost centre statement, is per 1 000 cubic metres of gas produced. Manufactured gas is distributed by means of the booster fans into metered gas mains. These mains lead to the user profit and cost centres.

The volume of gas distributed to each of the user profit or cost centres is recorded on the mains meters. The readings are taken and recorded daily. At the end of the last shift of the cost period, a master return of the total cubic meters of producer gas drawn by all profit and cost centres is forwarded to the accounts department. The total units of producer gas consumed are then the basis of the apportionment of the total cost of this cost centre for the cost period.

iv 100/810 Sasol gas and other combustible gases

a Responsibility

This cost centre is responsible for the supervising of stock, distribution and consumption of Sasol and other L P gases. It reports to the suppliers of gases all the necessary maintenance. A further function is to ensure adequate supplies at all times. This cost centre's responsibility ends at the isolating valves of the user profit or cost centre.

b Personnel

The personnel of this cost centre consists of one works clerk, two handymen and six Bantu.

c Memorandum total cost centre statement

DUNSWART IRON AND STEEL WORKS, LIMITED

WORKINGS RE MONTHLY STATEMENTS

19

WORKSHOPS AND AUXILIARIES

SASOL GAS ETC. - A/C 810

	<u>Last Month</u>	<u>This Month</u>
Salaries	_____	_____
European Wages	_____	_____
- Leave Pay	_____	_____

Bantu Wages	_____	_____
- Leave Pay	_____	_____
Depreciation	_____	_____
*Stores	_____	_____
Power	_____	_____
Water and Water Reticulation	_____	_____
Service Department Charges	_____	_____
- do -	_____	_____
Per Distribution	_____	_____
<u>Ledger Proof</u>		
Closing Balance	_____	_____
<u>Less:</u> Opening Balance	_____	_____
	_____	_____
<u>Add:</u> Back Transfers	_____	_____
	_____	_____

* Raw materials, Sasol and other gases etc.

d Unit and method of distribution

The unit of apportionment of the total cost of this cost centre, as per the memorandum total cost centre statement, is per 1 000 cubic metres of gas distributed. The determination of the user profit or cost centre in this instance is relatively simple. The meltshop consumes ± 98% of the total supply of all gases. Therefore the total cost of this cost centre is apportioned to the meltshop.

v 100/814 Oxygen

a Responsibility

This cost centre is responsible for the efficient distribution of oxygen that is manufactured by a direct supplier's Glib Plant situate on the premises and operated by the supplier's personnel. This Glib Plant produces approximately 1 000 cubic

...../meters

metres of oxygen per hour.

The oxygen is then pressure fed through steel piping throughout the entire works to all user profit and cost centres. The personnel of the undertaking is responsible for the supervising of stock and efficient distribution of the oxygen produced. Their responsibility ends at the isolating valves of the consumers.

b Personnel

The personnel of this cost centre consists of one works clerk, two handyman and six Bantu.

c Memorandum total cost centre statement

DUNSWART IRON AND STEEL WORKS, LIMITED

WORKINGS RE MONTHLY STATEMENTS

19

WORKSHOPS AND AUXILIARIES

OXYGEN - A/C 814

	<u>Last Month</u>	<u>This Month</u>
European Wages	_____	_____
- Leave Pay	_____	_____
Bantu Wages?	_____	_____
- Leave Pay	_____	_____
Depreciation	_____	_____
*Stores	_____	_____
Service Department Charges	_____	_____
Water and Water Reticulation	_____	_____
Power	_____	_____
Operator Travelling Allowances	_____	_____
Per Distribution	_____	_____

Ledger Proof

Closing Balance	_____	_____
<u>Less:</u> Opening Balance	_____	_____
	_____	_____
<u>Add:</u> Back Transfers	_____	_____
	_____	_____
	_____	_____

* Raw materials, oxygen etc.,

d Unit and method of distribution

The unit of apportionment of the total cost of this cost centre, as per the memorandum total cost centre statement, is per 1 000 cubic metres of oxygen produced. The oxygen is pressure fed via a main meter through steel piping to all user profit and cost centres. As this is an outside contractor's plant, it is essential that exact readings of oxygen produced are recorded at the mains meter as this is the quantity that is paid for at the contract price. The internal distribution is merely an estimated one. This is due to the fact that the cost of installing terminal meters to record consumption would not be warranted. The consumption of all the profit and cost centres, excluding the meltshop, cost centre code 320, is fairly constant. It is therefore not difficult to estimate this consumption on a percentage basis.

As the consumption for all profit and cost centres, excluding meltshop, is relatively constant then it is a fair assumption on the part of costfinding to assume, that in any given period, the unaccounted for difference between the fixed volume consumed by all other profit and cost centres and the volume charged for via the mains meter is attributable to the meltshop. Accordingly, the following unit distribution table is used for cost distribution:

<u>A/C No.</u>	<u>Set Cubic Meter Charge</u>
100/870	1 100
310	85 100
320	x
330	106 400
340	4 300
410	2 200

420	700
440	700
450	1 100
505	12 800

Where x - meltshop usage i.e. the difference between the total oxygen produced and this estimated total usage.

vi 100/818 Compressed air

a Responsibility

The responsibility of this cost centre is for the generation of compressed air, its distribution and the maintenance records of the two 2 500 CFU compressors that generate the compressed air. The responsibility ends at the feeder valve into the user profit or cost centres.

b Personnel

The personnel of this cost centre consists of two handymen and a number of Bantu that is determined from time to time by line management.

c Memorandum total cost centre statement

DUNSWART IRON AND STEEL WORKS, LIMITED

WORKINGS RE MONTHLY STATEMENTS

19

WORKSHOPS AND AUXILIARIES

COMPRESSED AIR - A/C 818

	<u>Last Month</u>	<u>This Month</u>
European Wages		
- Leave Pay		

Bantu Wages	_____	_____
- Leavy Pay	_____	_____
Depreciation	_____	_____
*Stores	_____	_____
Service Department Charges	_____	_____
Water and Water Reticulation	_____	_____
Power	_____	_____
	_____	_____
Per Distribution	_____	_____
<u>Ledger Proof</u>		
Opening Balance	_____	_____
<u>Less:</u> Closing Balance	_____	_____
	_____	_____
<u>Add:</u> Back Transfers	_____	_____
	_____	_____
	_____	_____
Amount Distributed	_____	_____

* Raw materials, consumable stores, etc.

d Unit and method of distribution

The unit of apportionment of the total cost of this cost centre, as per the memorandum cost centre statement, would in normal circumstances be per 1 000 cubic meters of compressed air. At every point of usage by consumer profit and cost centres metres would then be installed to record their usage. This is not so at Dunswart Iron and Steel Works, Limited, due firstly to the fact that at the time that this costfinding system was installed economy was the order of the day and the undertaking could ill afford the luxury of additional high cost meters. Secondly in terms of the materiality concept of cost finding the cost of this indirect cost centre was an insignificant part of the total cost of manufacture. The

...../comparability

comparability concept could be satisfied by means of a consistently applied formula of estimated consumption.

The actual user profit and cost centres were determined and an estimated percentage rate of usage of compressed air was made by a line manager. As and when additions to, and alterations in, the Plant were effected the estimate was updated and revised. The percentage distribution in use at present is as follows:-

<u>A/C NO.</u>	<u>£</u>	<u>AMOUNT</u>
100/864	15,0	_____
100/868	1,0	_____
100/870	<u>1,0</u>	_____
	17,0	_____
100/651	6,0	_____
100/442	2,0	_____
100/184	<u>9,5</u>	_____
	27,0	_____
320 Auxiliary Plant	24,0	_____
330	1,0	_____
411	5,0	_____
412	15,0	_____
421	5,0	_____
422	4,0	_____
423	3,5	_____
424	0,5	_____
441	3,0	_____
442	3,0	_____
451	3,0	_____

452	1,0	_____
454	1,0	_____
455	1,0	_____
500	1,0	_____
505	2,0	_____
	_____	_____
	100,0	_____

vii 100 844/5 Laboratory

a Responsibility

This cost centre is responsible for quality control in all its phases throughout the production process.

To enable them to achieve this objective they have the following means of testing and controlling at their disposal:

- i Computerised Quantovac
- ii Xray Fluorescent
- iii Spectographic laboratories
- iv Cobalt 60 Isotope
- v Inspection Oscilloscope and magnet sorting bridges

b Personnel

This cost centre consists of one specialist line manager, two deputies, thirty-one Europeans and forty-eight Bantu.

c Memorandum total cost centre statement

...../Cont.

DUNSWART IRON AND STEEL WORKS, LIMITED

ACCOUNT 844 - LABORATORY JULY, 1974

Acct. Code	COST ACCOUNT		JULY, 1974	
			Budget	Actual
801-3	Personnel Costs	Direct Labour/Auxiliary Wages		
804		Overtime Premium		
805		Paid Holidays		
806		Salaries		
		Other Personnel Costs		
		Total Personnel Costs		
814	Fuel	Oxygen		
817	Power	Electricity		
817		Compressed Air		
819/820		Water		
		Total Power		
	Material			
841-3	Other Operating Costs	Transport Costs		
849		Miscellaneous Operating Costs		
850		Miscellaneous Credits		
		Quantovac Computing Equipment Rental		
		Total Other Operating Costs		
864-870	Workshop Operating Rates			
	Extraordinary Maintenance			
890	Depreciation			
	TOTAL OPERATING COSTS OF DEPARTMENT			
	Less: Costs Apportioned Out			
	COSTS APPLICABLE TO PRODUCTION COST CENTRES			

d Unit and method of distribution

As will be observed the total cost of this cost centre is high. There is a material element of salaries included in its cost centre personnel costs, and to apportion the cost on a normal basis of daily paid employees would be inequitable. The solution to this problem was found to be to apportion the total cost of the cost centre to user profit and cost centres on the basis of the total personnel costs, per account number 801 - 806 of the memorandum total cost centre statement, as allocated to the areas that they serve. It was felt that this was an equitable basis and conformed with costfinding doctrines of consistency, materiality, disclosure and comparability.

INVERSE TIME OVERCURRENT AND EARTH FAULT RELAY

Type CDG11

The type CDG11 relay is a heavily damped induction disc unit with an inverse definite minimum time/current characteristic. The relay gives selective phase and earth fault overcurrent protection in time graded systems to transformers, a.c. machines and feeders etc., and ensures that a minimum number of circuit breakers are tripped to clear a faulted section (see Application Sheet MS/5087).

The operating coil is wound to give time/current curves of the same shape on each of seven current taps which are selected by a plug setting bridge. The highest current tap is automatically selected when the plug is removed, so that adjustments can be made on load without open-circuiting the current transformer.

The relay has a high torque movement to ensure consistent timing even under adverse conditions, and a low burden and overshoot. Adjustment of the time setting is made by rotating a knurled moulded disc against a graduated time multiplier scale.

A high set overcurrent unit (type CAG) can be fitted in the same case to provide instantaneous protection under maximum short circuit conditions (see Application Sheet MS/5087).

The type CDG21 relay is either a double pole version (with two earth fault units or two overcurrent units) of the type CDG11, or a type CDG11 with an instantaneous unit.

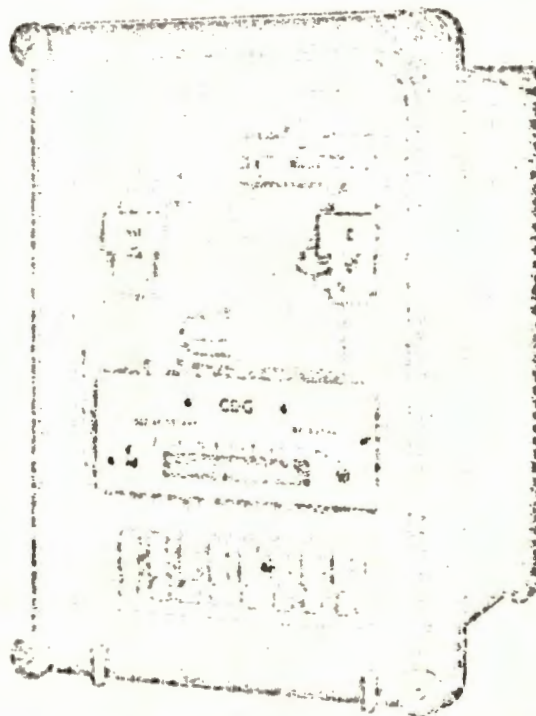
The type CDG31 relay is a triple pole version (with three overcurrent units or two overcurrent units and one earth fault unit in the centre) of the type CDG11.

CURRENT SETTINGS

10-40%, 20-80% or 50-200% of 0.5, 1 or 5 amps (C.T. ratings) 50 c/s, adjustable in seven equal steps

30-120% or 80-320% of 5 amps (C.T. rating) 50 c/s, adjustable in seven unequal steps

Starting Current 103-105% of current setting



CDG21 relay with auxiliary and instantaneous overcurrent units

Closing Current 115% of current setting (117% when fitted with a mechanical operation indicator)

Resetting Current The maximum current to which the disc will completely reset is 90% of current setting.

TIME SETTINGS

0-1.3 seconds at 10 times current setting or 0-3.0 seconds at 10 times current setting (B.S.142.1966)

Resetting Time With the time multiplier set at 1.0 the resetting times of the above are four seconds and nine seconds respectively.

Overshoot On removal of a current equal to 20 times current setting the overshoot times of the above are 0.065 second and 0.04 second respectively.

In the foregoing we have briefly discussed auxiliary departments (cost centres) that differ from each other in either the reasoning for their method of cost accumulation or in the method and reasoning for their apportionment to the profit or cost centres that they serve. As the balance of the auxiliary departments (cost centres) of the undertaking are of a similar nature i e, they have sufficiently comparable characteristics, these are now treated collectively in the balance of this chapter.

These are:

viii	a	100/823	Roll turning
	b	100/841	Cranes - overhead
	c	100/842	Works transport
	d	100/843	Mobile handling equipment
	e	100/846	Straightening and grinding

Responsibilities

- a 100/823 Roll turning

This cost centre is responsible for the cutting to size of all the new mill rolls which are received from overseas and local suppliers, as well as the surface maintenance of existing mill rolls. Further, when existing mill rolls become worn, are broken or damaged, these must be salvaged wherever possible and recut to another (smaller) production specification.

- b 100/841 Cranes - overhead

This cost centre comprises 40 downshop collector rail cranes with lifting capacities ranging from 40 tons upwards. It is responsible for all the transporting of raw material, liquid steel, ingots, billets and finished sections throughout the Plant. For the loading of scrap steel into the 15 ton -baskets- that feed the furnaces, electromagnetic attachments with a lifting capacity of five tons are used. These units are operated by the crane driver from the cab by remote control, and thus the loading function is also the responsibility of this cost centre.

- c 100/842 Works transport

This cost centre is responsible for the internal and external transport excluding overhead cranes and mobile handling equipment. This responsibility includes, inter alia, the maintenance and efficient operation of the fleet of passenger vehicles, tipping trucks, scooters and tankers.

- d 100/843 Mobile handling equipment

This cost centre is responsible for all the internal materials handling equipment. This equipment consists of front end loaders, bulldozers, forklift trucks and shunter tractors.

e 100/846 Straightening and grinding

This cost centre is responsible for the straightening and grinding of finished steel sections produced by the finishing mills. The straightening and grinding process is necessitated by the mass and length of the finished section and by the type of mill that rolls it. The factor that finally determines the amount of straightening and grinding to be done is the mass per metre of the finished section which varies as follows:

	Type of finishing mill	Length of average finished sections	Average kilograms per metre	Estimated % of output to be re-processed
i	22/18" heavy	15 metres	8	100
ii	12" medium	20 metres	4	75
iii	12" light	15 metres	2	25

It therefore becomes apparent that the majority of the finished sections produced pass through this cost centre.

Personnel

a 100/823 Roll turning

This cost centre consists of one foreman, twelve roll turners and apprentices and six Bantu.

b Cranes - overhead

This cost centre consists of eighty European crane drivers. As yet it has not been possible nor practicable to admit Bantu as crane drivers.

c 100/842 Works transport

This cost centre consists of one line manager, three mechanics, eight European drivers, nine Bantu drivers and twelve Bantu.

d 100/843 Mobile handling equipment

This cost centre consists of one European foreman and twenty Bantu drivers.

e 100/846 Straightening and grinding

This cost centre consists of one foreman, five European operators and forty-two Bantu.

Memorandum total cost centre statements

The memorandum total cost centre statements for these cost centres are all on the same basis of presentation and compilation, therefore we will reproduce one example only instead of one each for the following cost centres:

a	100/823	Roll turning
b	100/841	Cranes - overhead
c	100/842	Works transport
d	100/843	Mobile handling equipment
e	100/846	Straightening and grinding

The first section of these memorandum total centre statements are not published with the period's results. This section is only included in the working papers and is merely the mutation i e, the total movements of the mechanised ledger card for the period. This mutation is the sum of the various costs and transactions less the recoveries appertaining to the cost centre for the cost period. This mutation is therefore the total amount that the individual items on the memorandum total cost centre statement must add up to. It is a proof of the arithmetical accuracy of the memorandum total cost centre statements.

The format for these mutations is exactly the same as that for all other indirect cost centres (service and auxiliary departments) already discussed.

For ease of reference it is tabulated hereunder.

DUNSWART IRON AND STEEL WORKS, LIMITED

<u>Account Number</u>	<u>Description</u>	
	<u>Last Month</u>	<u>This Month</u>
<u>Ledger Proof</u>		
Closing Balance	_____	_____
<u>Less:</u> Opening Balance	_____	_____
<u>Add:</u> Back Transfers	_____	_____
	_____	_____

...../Cont.

The memorandum total cost centre that is published is then the following:

DUNSWART IRON AND STEEL WORKS, LIMITED

ACCOUNT

Acct. Code	COST ACCOUNT		JULY, 1974	
			Budget	Actual
801-3	Personnel Costs	Direct Labour/Auxiliary Wages		
804		Overtime Premium		
805		Paid Holidays		
806		Salaries		
		Other Personnel Costs		
		Total Personnel Costs		
814	Fuel	Oxygen		
817	Power	Electricity		
817		Compressed Air		
819/820		Water		
		Total Power		
	Material			
841-3	Other Operating Costs	Transport Costs		
849		Miscellaneous Operating Costs		
850		Miscellaneous Credits		
		Quantovac Computing Equipment Rental		
		Total Other Operating Costs		
864-870	Workshop Operating Rates			
	Extraordinary Maintenance			
890	Depreciation			
	TOTAL OPERATING COSTS OF DEPARTMENT			
	Less: Costs Apportioned Out			
	COSTS APPLICABLE TO PRODUCTION COST CENTRES			

Unit and method of distribution

The unit for, and method of, distribution of the total cost of these cost centres are all on the same basis. The unit of apportionment in all these instances is the hours spent by the cost centre concerned on other profit or cost centres.

The total cost for each of these cost centres is derived at the end of the cost period as per the memorandum total cost centre statements set out previously. Therefore the total cost to be distributed is known. The total number of converted hours worked on outside profit and cost centres is an automatic by-product of computerised timekeeping operations based on the hours worked for other departments which are recorded by the cost centre concerned. THE PROOF OF THE ARITHMETIC ACCURACY OF THESE HOURS WORKED IS THAT THE EMPLOYEES RECEIVE THEIR CORRECT REMUNERATION. This is made possible by the fact that these hours are those that the computerised payroll is based on. An example of automatic control at the source of a transaction.

It is then a relatively simple matter for costfinding to calculate the hourly rate and to apportion the costs of each cost centre on an hourly basis to the user profit or cost centres.

In this final chapter we have now briefly reviewed the incidence of overhead, and other indirect cost centres on the cost structure of the undertaking. These are the cost intensive indirect and pseudo indirect services which can so materially affect the profitability of the undertaking as they are literally hidden costs and therefore they cannot be directly charged to any one specific process or product but only apportioned out to the profit or cost centres that they serve on some equitable basis. As such this indirect cost is absorbed into manufacturing (direct) cost, and in normal circumstances becomes the most difficult component or element of cost to control. We have also demonstrated that it is not only possible but also relatively easy (everything is at a cost!) to subject this type of latent (indirect) cost to a rigid source control, which, in turn, allows scientific management control to be applied to this latent (indirect) type of cost in the same way as if they were patent direct (manufacturing) costs. We have also endeavoured to emphasise the magnitude of the cost of these indirect services, because by so doing modern scientific management and its multiplicity of controls, can be alerted to the scope and consequences inherent in malfunctioning, as well as to the impact, undertakingwise, of untoward factors upon the total cost structure of a marginal industry - marginal in the sense that price control is strictly applied by the Government AND UNNECESSARY COST INCREASES IS AT THE EXPENSE OF THE PROPRIETARY INTERESTS.

In this illustration of costfinding as applied to overhead and other indirect cost, we have demonstrated the active and constant operating of the three phases of evaluation and reporting, controlling and recording inherent in costfinding as a whole. These are the principles that permeate and apply with equal force throughout the undertaking to direct, as well as to, indirect costs.

Finally, in closing this chapter, we would bring to the reader's attention that in the foregoing we have but briefly illustrated the principles of costfinding as applied to overhead and other indirect cost. In the integrated steel works of Dunswart Iron and Steel Works, Limited these principles apply in exactly the same way to the entire production process. To endeavour to discuss the application of costfinding to largescale production units would take many volumes. In fact it would necessitate practically reproducing the manuals that have been compiled at this installation, an impossible task in a work of this nature. Instead we trust that the sample of the whole that we have covered herein (with all due respects to the law of statistical regularity) will suffice to let the reader agree with us when we conclude with the submission that the methods of cost collection, apportionment (recovery) and control advocated by costfinding are relatively simple yet effective.

CONCLUSION

(pages 8 180 (i) - 8 189)

CHAPTER VIII

INDEX

- 1 Costfinding has achieved its goal at Dunswart Iron and Steel Works, Limited
- 2 The implemented system complies with, and meets the requirements of the four basic objectives of internal control, viz:
 - 1 The protection and safeguarding of assets and income
 - 2 The promotion of operational efficiency
 - 3 The encouragement of adherence to prescribed managerial policy
 - 4 The ensuring of automatic control of the accuracy and reliability of the accounting data
- 3 Both the criteria and the implemented system satisfy the basic objectives of internal control by the following criteria:
 - 3 1 Supervision at the source - flowing from planning, budgets etc, - and scientific organisation
 - 3 2 The expressway of management reporting -
 - 3 2 1 Appropriate management information - to lead, guide and direct
 - 3 2 2 The publication of fast control information - income statements etc.
 - 3 3 Interpretation for objective achievements - inter alia costfinding
- 4 There is positive correlation between the elements that permeate this thesis and the basic objectives of internal control insofar as all the elements:
 - 4 1 Protect and safeguard assets and income in every possible way;
 - 4 2 Encompass the production facilities within the purview of the numerical control of units, mass and plant utilisation, from which there follows the AUTOMATIC promotion of operational efficiency;
 - 4 3 Control and report on positive and negative variances, by accountabilities, both in quantity and in value, from the prognosed norm, whereby adherence to prescribed managerial policy is not only enforced but remedial management policy decisions

...../are

are facilitated and expedited;

and

4 4 Enforce the strict application of the principle of the division of duties and responsibilities between the transacting, recording and custodianship functions, thus promoting maximum extent of automatic control over the accuracy and reliability of the accounting data

5 As the final test the elements of this thesis are subjected to the critical, cold, hard, and impartial scrutiny of the audit appraisal.

5 1 The objectives of an audit can be divided into two categories:

5 1 1 The immediate

The ascertainment of the reliability of the financial statements, and the rendering of an opinion of the fairness of the presentation of those statements

5 1 2 The future - long range

The serving as a guide to management's future decisions in financial matters such as planning, analysing and reporting.

Therefore an audit is not solely a historical summing up as BOTH OBJECTIVES AIM AT THE IMPROVEMENT OF PERFORMANCE, which, in turn, serves as the basis for future guidance of management in the conduct of their undertaking.

5 2 Costfinding and auditing are founded on the same basic principles and standards as the objectives and concepts of costfinding can be closely identified with the following principles and standards which, WITHOUT EXCEPTION, are the basic guides in the performance of an audit, viz:

- i Scientific management control - internal control
- ii Disclosure - the maximum disclosure of all material and relevant facts
- iii Comparison -
 - a as control - budgets forecasts etc.
 - b with the similar facts, figures and statistics of the preceding period and year to date
- iv Comparability - that all similar facts, figures and statistics are strictly comparable. If this is not the case, then to draw attention thereto by way of a note
- v Responsibility - in the functional sense

- vi Control at the source of an entry or transaction
- vii Materiality - the full disclosure of essential information so that statements present fairly the financial condition and operating results of the undertaking
- viii Consistency - the application and construing of all the basic principles of accounting, cost accounting and costfinding on a basis consistent with that of the preceding period and, by so doing, avoiding any distortions of the financial results of the operations of the undertaking.

5 3 The criteria - elements - of this thesis pass the crucial test and there also emerges a motivation corollary common to the profession and this thesis - their mutual aim to:

5 3 1 improve performance

5 3 2 assist by expediting the ascertainment of the reliability of the financial statements

6 THE MEANS - MANAGEMENT CONTROL BY ANY NAME, METHOD OR APPLICATION.

CONCLUSION

Now, in concluding this thesis, there remains only the following to be considered. Does an evaluation of the data contained therein justify the opinion that:

- 1 The costfinding system installed at Dunswart Iron and Steel Works, Limited has proved successful and has achieved its goal by providing the company's management with the means of rejuvenating an ailing concern?
- 2 The development of both the criteria and the implemented system revolves around and satisfies the basic objectives of internal control, in its wider sense recognising management control as a super tool for achieving results, particularly in respect of express reporting by means of dual controls?

Stated specifically, does the implemented system comply with, and meet the requirements of, the four basic objectives of internal control, viz:

- 1 The protection and safeguarding of assets and income
- 2 The promotion of operational efficiency
- 3 The encouragement of adherence to prescribed managerial policy
- 4 The ensuring of automatic control of the accuracy and reliability of the accounting data?

THE ANSWER TO THE ABOVE IS IN THE AFFIRMATIVE!

To substantiate this statement it is best to review the foregoing considerations in two sections viz:

- 1 Has costfinding achieved its goal?
- 2 Do both the criteria and the implemented system satisfy the basic objectives of internal control?
- 1 Has costfinding achieved its goal?

That results speak for themselves is indisputable. Hereunder we give three tables which are independent proof of the fact that costfinding, as applied in the undertaking, has achieved its goal:

cf Heyman C G - Die vraagstuk van die ontwerp en kosprys van staaloonde in die republiek van Suid-Afrika - An unpublished Doctor's Thesis (PU vir CHO).

Table 1 - Net profit before taxation as a percentage of equity

JAAR	1964	1965	1966	1967	1968	1969	1970	GEMIDDELDE WINS
YSKOR	11,1	9,4	4,9	6,2	3,9	4,2	3,4	6,1
UNTESTAAL	17,0	12,0	7,1	8,2	12,7	14,1	18,1	12,8
DUNSWART	31,1	21,7	13,7	26,9	28,6	27,4	30,6	25,7
GEMIDDELD	19,7	14,4	8,6	10,4	15,1	15,2	17,4	
GEMIDDELD VIR DIE INDUSTRIE AS GEHEEL	21,0	21,1	19,0	18,0	17,1	16,3	19,5	

Table 2 - Net profit before taxation as a percentage of equity-graphically depicted

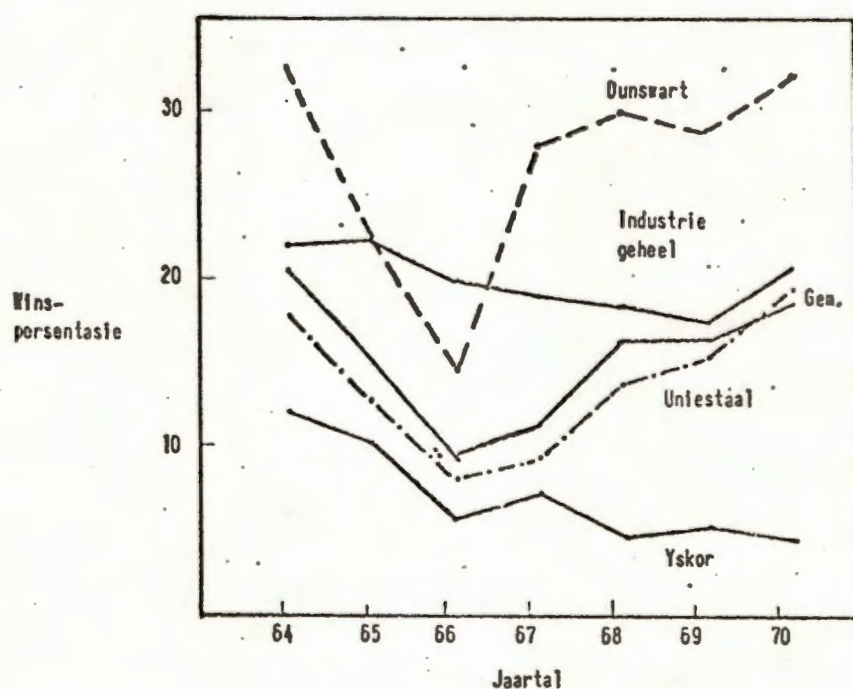


Table 3 - Net profit before taxation as a percentage of capital employed.

(Averages from 1964 to 1970)

	GEMIDDELDE KAPITAAL - GEBRUIK (R MILJOEN)	GEMIDDELDE WINS (%)
YSKOR	375,303	6,1
UNTESTAAL	24,021	12,8
DUNSWART	7,957	25,7

In closing this section we would point out that in 1968 Dunswart Iron and Steel Works, Limited commenced on the -take over trail- and acquired the controlling interest in its first subsidiary. Further, since 1968 Dunswart Iron and Steel Works, Limited has regularly been included in the Sunday Business Times top hundred companies.

- 2 Do both the criteria and the implemented system satisfy the basic objectives of internal control?

These elements of the control propounded in this thesis can categorically be stated to correlate positively with the four objectives of internal control by the following criteria:-

- 1 Supervision at the source - flowing from planning, budgets etc, - and scientific organisation.
- 2 The expressway of management reporting -
 - 2 1 Appropriate management information - to lead, guide and direct
 - 2 2 The publication of fast control information - income statements etc.
- 3 Interpretation for objective achievements - inter alia costfinding

Penultimately, in finalising the formation of our opinion as to whether the views, thoughts, facts, premises and data contained in this thesis comply with the accepted definition and objectives of internal control, we must briefly reconcile the elements that permeate the thesis with the four basic objectives of internal control.

To accomplish this best, let us review and ascertain the degree of correlation between the four main objectives of internal control and the elements as set out in Chapter VI, i e,

- i The stores function
- ii The wages function
- iii The perpetual inventory function
- iv The umbrella that safeguards and protects - three advanced aspects of swift policy decisions:
 - a Swift wages - productivity variance reporting
 - b Numerical control of value by the tariff method of cost equation
 - c The elimination of the historical time lag and the reliability of the data.

In each instance, there is, albeit inextricably interwoven and intertwined to meet the needs of

...../the

the multi-million rand largescale production units of today, full compliance in every sense

with the four objectives of internal control insofar as all elements:-

- 1 Protect and safeguard assets and income in every possible way;
- 2 Encompass the production facilities within the purview of the numerical control of units, mass and plant utilisation, from which there follows the AUTOMATIC promotion of operational efficiency;
- 3 Control and report on positive and negative variances, by accountabilities, both in quantity and in value, from the prognosed norm, whereby adherence to prescribed managerial policy is not only enforced but remedial management policy decisions are facilitated and expedited;
and
- 4 Enforce the strict application of the principle of the division of duties and responsibilities between the transacting, recording and custodianship functions, thus promoting the maximum extent of automatic control over the accuracy and reliability of the accounting data.

Further, to promote the basic objectives of internal control the criteria must be so applied as to ensure:

- 1 That all control measures are absorbed into, and become, an integral part of the homogeneous whole of the activities of the undertaking;
- 2 That control flows into a heterogeneous pattern of differentiation of set functions.
Chronologically viewed, these functions are -
 - a the origin of the managerial or entrepreneurial team;
 - b the postulation of an infrastructure to achieve the goal, whether it be premises, buildings, re-inforcing ancillaries, etc, and
 - c the postulation of potential to provide policy for activities as well as for control measures.

All culminate in the accounting to management, through accountability, by means of an effective expressway of management reporting so as to ensure THE SPECIFIC PROVISION OF AN IDENTIFIABLE CONTROL TRAIL FOR INSTANT DECISION AND ACTION BASED ON BOTH EXCEPTION AND OBSERVATION.

Now, as the final test, let us subject the elements of this thesis to the critical, cold, hard and impartial scrutiny of the audit appraisal.

The objectives of an audit can be divided into two categories:

1 The immediate

The ascertainment of the reliability of the financial statements, and the rendering of an opinion of the fairness of the presentation of those statements

2 The future - long range

The serving as a guide to management's future decisions in financial matters such as planning, analysing and reporting.

Therefore an audit is not solely a historical summing up as BOTH OBJECTIVES AIM AT THE IMPROVEMENT OF PERFORMANCE, which, in turn, serves as the basis for future guidance of management in the conduct of their undertaking.

Further, costfinding and auditing are founded on the same basic principles and standards. A close scrutiny of the criteria of the implemented system reveals conclusively that the objectives and concepts of costfinding can be closely identified with the following principles and standards which, WITHOUT EXCEPTION, are the basic guides in the performance of an audit, viz:

- i Scientific management control - internal control
- ii Disclosure - the maximum disclosure of all material and relevant facts
- iii Comparison -
 - a as control - budgets forecasts etc.
 - b with the similar facts, figures and statistics of the preceding period and year to date
- iv Comparability - that all similar facts, figures and statistics are strictly comparable.
If this is not the case, then to draw attention thereto by way of a note
- v Responsibility - in the functional sense
- vi Control at the source of an entry or transaction
- vii Materiality - the full disclosure of essential information so that statements present fairly the financial condition and operating results of the undertaking
- viii Consistency - the application and construing of all the basic principles of accounting, cost accounting and costfinding on a basis consistent with that of the preceding period and, by so doing, avoiding any distortions of the financial results of the operations of the undertaking.

When seen in the light of these indisputable facts, it becomes unequivocally clear that, not only do the criteria - elements - of this thesis pass the crucial test, but further that there is a motivation corollary common to the profession and this thesis. And this corollary is their mutual aim to:

- 1 Improve performance
- 2 Assist by expediting the ascertainment of the reliability of the financial statements.

The means - management control by any name, method or application. Or, stated differently - -all roads lead to Rome- - as all forms of control have only one goal - the protection and safeguarding of assets and income and the achievement of optimum returns at all times to the proprietary interests.

Now, having reviewed this thesis, and having answered the final questions as to the validity of its doctrines, may we be excused should we, with a touch of -prognostic- nostalgia, endeavour to reconcile future exigencies with the past based on the present. Times change - but change takes time - sage words of wisdom but difficult to reconcile with the fact that time and tide wait for no man. The tragedy of it all is that, although time is the one commodity that we can least afford, it is often the one that is dissipated most.

But in the cost-intensive sententious seventies, with their ever changing pattern of management problems, it is daily becoming more apparent that there is a further -commodity- that we can even less afford to dissipate. And that is control - the management control in its true sense to which this thesis is dedicated; the one that must thwart not only the future Chwedians and Poplaks, but also preclude debacles of the magnitude of Rolls Royce, Pergamon and Pennsylvania Grand Central; the one that must not only protect and safeguard assets and income but also ensure optimum returns from the production facilities at all levels of production, at all times

...../and

and in all circumstances - ALL BASED ON EFFECTIVE SUPERVISION AT THE SOURCE.

As previously stated, this is not a new, as yet unheard of, control, but the old -dressed- in the fashion of today, the -space-age- conglomerate universe of cost intensive, large scale production units, where the survival of ONLY the fittest is possible. As we are, at heart, still -savages-, but now armed with nuclear power instead of bows and arrows, we must likewise be armed with a management control of -nuclear power-.

In internal control etc, many aspects of control were considered, including the counter to the computer criminals, the magnitude of which we could only quote in this thesis when the possible became the reality. We have mentioned disasters that could have been minimised, or even averted altogether, had managements been properly -armed-. In the dissertation attention was focussed, in the main, on the more glamorous -twin- of the dual streams of control, the dynamic one.

Therefore in this thesis equal, if not more, attention is focussed on the static aspect of the twin, or dual, streams of successful and effective management control, and on some of the means, seen against an empirical background, of the follow-through of the twin streams of constantly interacting static and dynamic controls that makes possible swift policy decisions based on rapid reporting as the inlet to the highway of scientific management control.

cf Internal Control etc, op cit, Chapter V section ii page 168 - The principles of scientific internal control in the E D P Department of the future.

The pseudonym of business success is Growth; and growth depends on vibrant successful and dynamic management control. Conformity to tradition and habits is static.

However, to rock the boat needs courage. But to the many managements, those temporary acting captains of industry, whose only controls for the running of their companies are those of yesterday, we recommend this philosophical point for them to ponder on: -old age has little to do

...../with

with a man's years. It is only when he is more absorbed with the past than with today and tomorrow, that he has become old, redundant and expendable-. So is it with company management. A progressive and scientific management is dynamic, and is constantly in search of current and planned future -know-how- to be used as a swift basis for today's decisions and tomorrow's plans. Out of the need to breed, expedite and encourage this type of company management was costfinding born in 1965.

The costfinding which was founded on dynamic and static management control methods, and mechanisms, that culminated in the twin or dual streams of control, that formed the umbrella covering the spectrum. The multiplicity of controls that permeate the entire undertaking to safeguard and protect, and to promote scientific management policy formulation and rapid decision making. In other words A SYSTEM GEARED TO MANAGING THE PRESENT ON WHICH THE FUTURE CAN BE BUILT - which is the antithesis of the systems of control still very much the vogue today, which, by facing the past, back-up into the future - the time lag inherent in the historical accounting - orientated systems of control.

cf Today virtually the equivalent of driving your car by looking into the review mirror! Whilst we have in no way whatever declared war on tradition, the Jules Verne-like theories and applications of management control that we have advocated in this thesis are no figments of the imagination. Applied costfinding principles resulted already in 1967 in results for the financial year ended 30th June, 1967 being circulated in printed form to the proprietary interests within FIVE days after the financial year end. Refer annexure 15. The audited accounts required no change. Coupled with this achievement was also the fact that only three years after the necessity to call for the sorcerers (consultants), the financial results accomplished by this concern were the best of all the Steel Works in the private sector. The following financial

...../year

year started this undertaking on the takeover trail, and simultaneously therewith, the extension of the management control systems of the -conqueror- to the -conquered-, who today are all flourishing concerns with one uniform costfinding system of management control applicable throughout!

We have now dealt with various aspects and forms of management control all based on the twin, or dual, streams of control that originate from the static and dynamic concept of management control as propounded in this thesis. And we trust that the reader too, through our experience, has become aware of the vast potential that control, in its new look fashion, dressed to match the -space age- requirements of today, holds for us.

We have also shown that the conception of the control of De Paula, Lancaster, and the other pioneers, in no way need stand ashamed. It is still the same - only now re-orientated, revitalised and applied in a format and manner to befit its new designation - MANAGEMENT CONTROL!

Further we have reviewed theoretically and practically, and dealt with, various phases of the control which covers the spectrum. Much of this is not new and novel, but in the form of pioneering, exploring and probing AN OLD UNIVERSE IN A NEW WAY, presenting the possibilities for new -expressways- to replace the old winding trails, dusty roads and tortuous tracks and byways. The -expressways- are the highway of scientific management control with swift policy decisions based on express reporting as the inlet.

Finally, in closing, may we respectfully submit that, although, unlike Caesar, we cannot say that we came, we saw and we conquered, we trust that those who follow us, and the trail that has been blazed, may yet achieve the optimum, that Utopia of management control, so vital to the continued success and well-being of the undertaking.

As so, with the reader, the future, and those that follow, we rest our case

ANNEXURES

DUNSWART IRON AND STEEL WORKS, LIMITEDSUMMARY OF MANAGEMENT REPORTING AND FREQUENCYOPERATIVE AS AT SEPTEMBER, 1972

			FREQUENCY
1.	Preliminary Statistics	*	M
2.	Gas Producer Total and Components of Cost		M
3.	Overhead Comparison Actual to Budget	*	M
4.	Monthly Cost Statistics	*	M
5.	Abbreviated Statistics	*	M
6.	Furnace Linings and Maintenance Tariff Accounts		M
7.	Other Tariff Accounts: Mill Roll and Tackle, Moulds and Appliances, Furnace Linings, Maintenance		M
8.	Ingot Moulds Tariff Accounts		M
9.	Maintenance - C.C.P. - Tariff Account		M
10.	Laboratory - Test, Trials and Analysis		M
11.	Summary of Finished Products Scrapped ex Stock		M
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1. Reports marked with an asterisk are distributed in indexed book form

together with various supplementary detailed reports, comparisons with budgets, deviations from set norms, and adverse and favourable variances.

2. Not included above are:-

2,1 Adverse variance reports submitted when variances are revealed that necessitate immediate remedial action

2,2 Daily, Weekly and Monthly shopfloor numerical control statistics.

3. Costfinding Statistics and management control systems are functional, derived from, and based on a computerised and mechanised accounting system that precludes entirely hand written books of account and records.

4. The inherent time lag in reporting has been reduced to a minimum Preliminary profit and cost results are usually available to Management within approximately three days of the end of the Accounting period.

Key

D = Daily

W = Weekly

M = Monthly

DAILY PRODUCTION SUMMARY (TONS)

DATE

SPONGE IRON

MELTING SHOP

Krupp V
Demag IV
III
II
I

TOTAL LIQUID

Liquid Steel

for Ingots

Ingot Production

C.C. PLANT

Input
Output
Yield

ROLLING MILLS

30" Input
Output
Yield

HEAVY MILL

Input
Output
Yield

MEDIUM 12" MILL

Input
Output
Yield

LIGHT 12" MILL

Input
Output
Yield

TOTAL SECTIONS

DESPATCHES

BILLETS SOLD

.....
.....
.....

DAILY		PROGRESSIVE	
Actual	Planned	Actual	Planned

--	--	--	--

--	--	--	--

QUALITY SUMMARY		
Quality	Actual	Planned
TOTAL		

Stocks

Tons

Sponge I		
Ingots		
Ingots		
Ingots		
Billets Own		
Billets Export		
Sections		

Tons/Hour (Manned Time)

30"		
Heavy		
Medium		
Light		

SCRAPPED		
	Daily	Prog.
Ingots		
Billets		
Sections		

DUNSWART IRON AND STEEL WORKS, LIMITED

DAILY PRODUCTION

30" MILL

DATE:

Planned Shift Time Hours	Manned Time Hours	Primary Productive Time Hours	Ingots Charged Mass Tons	Billets Produced Mass Tons	Yield %	Tons per hour on Manned Time	Remarks

FINISHING MILL

MILL	Planned Shift Time Hours	Manned Time Hours	Primary Productive Time Hours	Billets Charged Mass Tons	Sections Produced Mass Tons	Yield %	Tons per hour on Manned Time	Sections Rolled	Remarks

DUNSWART IRON AND STEEL WORKS, LIMITED

ELPIT OPERATION

DATE:

30" MILL PRODUCTION TONS/HOUR	INGOTS CHARGED IN ELPIT			CHARGED	REMARKS
	900	+900	TOTAL	RATED CAPACITY	
	TONS	TONS	TONS	%	
Day Shift					
Night Shift					
TOTAL AVERAGE					
TOTAL				<u>RATED CAPACITY</u>	

D. I. S. W.

DAILY PRODUCTION SUMMARY (TONS)

DATE.....4-6-74.....

SPONGE IRON
MELTING SHOP

KRUPP V
DEMAG IV
III
II
I
TOTAL LIQUID

Liquid Steel
for Ingots

Ingot Production

C.C. PLANT

INPUT

OUTPUT

YIELD

DAILY		PROGRESSIVE	
Actual	Planned	Actual	Planned
---	---	---	---
303	400	1668	1600
159	200	700	800
236	220	836	880
---	---	---	---
45	30	98	120
743	850	3302	3400

481	510	1827	2040
473	502	1799	2009
262	340	1475	1360
250	328	1432	1312
95,4	96,0	97,1	96,0

QUALITY SUMMARY		
Qual.	Act.	Plan.
B20/5	409	438
B45/7	27	24
A70/6	45	48
CC	262	340
TOTAL	743	850
STOCKS	TONS	

Sponge I		8982
Ingots	1,9	2261
Ingots	0,9	116
Ingots		
Billets own		1928
Billets export		6307
Sections		2754

ROLLING MILLS

30" INPUT

OUTPUT

YIELD

425	587	814	1174
375	519	719	1038
88,2	88,4	88,3	88,4

Tons/Hour (Manned Time)		
30"	27,99	27,03
Heavy	22,57	19,13
Medium	8,26	10,06
Light	8,41	7,09

HEAVY MILL

INPUT

OUTPUT

YIELD

175	397	657	992
158	359	593	897
90,3	90,5	90,3	90,5

102 x 51 CHANNEL

MEDIUM 12" MILL

INPUT

OUTPUT

YIELD

156	182	477	468
142	166	434	426
91,0	91,0	91,0	91,0

80 x 40
50 x 20
90 x 16 FLAT
65 x 12

LIGHT 12" MILL

INPUT

OUTPUT

YIELD

209	237	308	474
185	216	273	432
88,5	91,0	88,6	91,0

10 mm ROUND
10 mm DEF BAR

TOTAL SECTIONS

485	741	1300	1755
-----	-----	------	------

DESPATCHES

BILLETS SOLD

-CEC STOTT

-EXPORT-

410	---	728	---
---	13	---	52
1053	194	1053	776

SCRAPPED Daily Prog.		
Ingots		
Billets		
Sections	100	100

SPONGE IRON USED D.I.S.W.

DAILY
48PROG
270

DUNSWART IRON & STEEL WORKS, LIMITED 4-6-74

BILLETS EXPORTED - LEO RAPHAELY ORDER 6 600 TONS

	<u>JUNE</u> <u>19 74</u>		<u>PROGRESSIVE TO DATE</u>	
	<u>PRODUCED</u>	<u>RAILED</u>	<u>PRODUCED</u>	<u>RAILED</u>
115 mm			6530	6561

BILLETS EXPORTED - PHILLIPPE BROS. ORDER 60000 TONS

	<u>JUNE</u> <u>19 74</u>		<u>PROGRESSIVE TO DATE</u>	
	<u>PRODUCED</u>	<u>RAILED</u>	<u>PRODUCED</u>	<u>RAILED</u>
130mm	---	---	9817	7033
150mm	607	1053	23201	19528
TOTAL	607	1053	33018	26561

SPONGE IRON EXPORTED - DERBY & CO. ORDER 10,700 TONS

	<u>JUNE</u> <u>19 74</u>	<u>PROGRESSIVE TO DATE</u>
RAILED		10,714

DUNSWART IRON & STEEL WORKS, LIMITED

ELPIT OPERATION

DATE4-6-74.....

30" MILL PRODUCTION TONS/HOUR	INGOTS CHARGED IN ELPIT				REMARKS
	900	+900	TOTAL	RATED CAPACITY	
93 TONS COLD INGOT CHARGED	TONS	TONS	TONS	%	<u>DAY SHIFT</u>
Day Shift .....29,8.....	38	53	91	91,9%	$\frac{1}{4}$ OF 1 ROW EMPTY OVER 11 HOURS. (12,5% OF ELPIT CAPACITY) 2 ROWS IN OPERATION
Night Shift .....26,4.....	103	---	103	104,0%	
TOTAL AVERAGE .....28,0.....	---	---	---	---	<u>K.W.H. CONSUMPTION</u>
TOTAL	141	53	194	98,0%	139,6 PER TON INGOT ROLLED
				<u>RATED CAPACITY</u>	
			22 HOURS x 9 TONS = 198 TONS		

DAILY PRODUCTION

30" MILL

DATE:4-6-74.....

Planned Shift Time Hours	Manned Time Hours	Primary Productive Time Hours	Ingots Charged Mass Tons	Billets Produced Mass Tons	YIELD %	Tons per hour on Manned Time	REMARKS
18,40	13,40	12,30	425	375	88,2	27,99	ALL PITS COLD 8 HOURS. SHEARING PINS BROKE 20 MIN. C BAY CRANE O.O.O. 30 MIN. STOP 5.10 P.M. ALL PITS COLD STOP 3.10 A.M.

FINISHING MILL

MILL	Planned Shift Time Hours	Manned Time Hours	Primary Productive Time Hours	Billets Charged Mass Tons	Sections Produced Mass Tons	Yield %	Tons per hour on Manned Time	Sections Rolled	Remarks
18"/22"	22,00	7,00	7,00	175	158	90,3	22,57	102 x 51 CHANNEL	WAITING FOR HEAT 5 HOURS. FURNACE OFF 7 HOURS. STOP 3.0 A.M. FURNACE OFF
12"	23,00	17,20	15,90	156	142	91,0	8,26	80 x 40 50 x 20 90 x 16 FLAT 65 x 12	WAITING FOR HEAT 1 LOADING BOX BROKEN HR. CHANGED 4TH ST ROLLS + SECTION 2P STOP 4.00 P.M. CHA ROLLS + SECTION ST 5.10 A.M. NEW CARE BOLTS 2ND STAND
Siemag	24,00	22,00	20,60	209	185	88,5	8,41	10 mm ROUND 10 mm DEF BAR	CHANGE ALL PASSES FINISH 1HR. BAR S IN RUNNER T.T. BRO 1 HOUR

DUNSWART IRON AND STEEL WORKS, LIMITEDBENONICONSUMABLE STORES - INDEX

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C.A. 8.6.1973

Stock No.

Average Price

[illegible]

DUNSWART IRON AND STEEL WORKS, LIMITEDSTANDARD PRACTICE PROCEDURE FOR THE RECEIPT OF SUPPLIES1. By Road

1,1 Conditions of Acceptance

- 1,1,1 All deliveries by Road must be made from Mondays to Fridays during normal working hours, viz. from 8,00 a.m. to 4,30 p.m.
- 1,1,2 All goods must be cleared through the Stores area before being off-loaded. Suppliers' delivery notes must bear the official Stores stamp indicating that the goods have been cleared before off-loading.
- 1,1,3 In all instances the location for off-loading will be designated by the Chief Storekeeper.
- 1,1,4 Suppliers' delivery notes must reflect the Company's official buying order number. Deliveries not covered by official buying orders are to be returned to the suppliers immediately.
- 1,1,5 Delivery notes must in all instances be signed by an authorised member of the Stores staff only when the goods as stated on the delivery note have been off-loaded in the location designated by the Chief Storekeeper.
- 1,1,6 Where goods required for immediate consumption are off-loaded, after being cleared through the Stores area, in a sector of the works other than Stores, the copy of the delivery note

to be signed and retained by Stores must be countersigned by a responsible person employed in the sector concerned acknowledging receipt of the goods. A Stores issue requisition for the goods, signed by an authorised signatory in the sector concerned, must be obtained simultaneously.

1,1,7 Where goods are to be off-loaded at sub-stores under the jurisdiction of the Melt Shop Manager, the copy of the delivery note to be signed and retained by Stores must be countersigned by an authorised person employed in the Melt Shop area acknowledging receipt of the goods.

1,1,8 All goods delivered in bulk must be weighed over one of the company's road weighbridges before being cleared through the Stores area. The weighbridge ticket must be presented with the relevant delivery notes before off-loading may be authorised. Coal deliveries must be supported by Government-recognised weighbridge tickets submitted by the supplier in addition to the company's weighbridge tickets.

1,2 Documents

1,2,1 All properly signed and stamped delivery notes and, where applicable, weighbridge tickets, must be married up with the

relevant copies of buying orders in Stores Orders File.

1,2,2 Where documents cannot be married up with the buying order, all documents must be referred to the Chief Storekeeper who is responsible for investigating any discrepancies.

1,2,3 The married up documents and buying orders are retained in the Stores Orders File awaiting suppliers' invoices for final clearance.

2. By Rail

2,1 Coal: To be off-loaded at coal dumping sites.

2,2 Raw Materials, certain metallic and non-metallic additions, refractories, etc. which are controlled by the Melting Department: To be off-loaded at sub-stores under the jurisdiction of the Melt Shop Manager.

2,3 Rolls: To be off-loaded at sub-stores in Rolling Mills area.

2,4 All other goods: The location for off-loading is designated by the Chief Storekeeper. Where goods required for immediate consumption are off-loaded in a sector of the Works other than the Stores Area, a Stores requisition for the goods, signed by an authorised signatory in the sector concerned, must be obtained before delivery to designated areas.

2,5 Copies of Rail Advice Notes: must be attached to relevant copies of buying orders in Orders File. Details of truck numbers, weights,

and description of goods must be recorded in Goods Received by

Rail book - Details obtained from Siding Daily Report Book.

3. By Post

- 3,1 All goods received by post are to be delivered to the Chief Storekeeper who must check that the goods are undamaged and conform with the details on the packing advice note. Where the goods are required for immediate consumption, the department requiring the goods must be advised immediately. A Stores requisition signed by an authorised signatory for the department concerned, must be obtained before the goods are released.
- 3,2 All copies of Packing Advice Notes must be attached to relevant copies of buying orders in Orders File.

DUNSWART IRON AND STEEL WORKS, LIMITEDSTORES REQUISITION SIGNATORIES AS AT 28TH FEBRUARY, 1973SPECIMEN SIGNATURE1. GENERAL

1,1 C.L. Cartwright

1,2 K. Schermer

1,3 C.F.O. Rademan

1,4 H. Herold

1,5 H.B. Steyn

2. SALES

2,1 K. Allen

2,2 W. Patrick

3. PROJECTS OFFICE

3,1 H. Jew

3,2 B. Groenewald

4. FOUNDRY

4,1 A. Kukla

4,2 A. Lavors

4,3 W. Noack

4,4 N. Bayman

4,5 F. McKinnon

4,6 C. Coetzee

4,1 PATTERN SHOP

4,1,1 L. Drennan

4,1,2 S. Venter

5. FURNACES

5,1 F. Lehman

5. FURNACES (Cont.)

5,2 L. Connellan

5,3 J.L. le Grange

5,4 K. Borowski

6. GAS PLANT

6,1 A. Bowie

7. MILLS

7,1 F. Switala

7,2 E. Fisher

7,3 G. Ferreira

7,4 W.R. Morgonstern

8. LABORATORY

8,1 M.P. Badenhorst

8,2 J.V. Scrooby

9. ENGINEERING

9,1 G.H. Schoenfelder

9,2 P.C.E. Gertholtz

9,3 R. Katz

9,4 P. Bellingan

9,5 D. Pearson

9,6 C. Clark

9,7 J. Dearlove

9,8 A. Rein

9,9 P. du Plessis

9,10 V. Clark

9,1 ELECTRICAL

9,1,1 J. Nicholls

9,1,2 E. Brett

9,1 ELECTRICAL (Cont.)

9,1,3 N. Venter

9,1,4 W. Bennie

9,2 BRICKLAYERS

9,2,1 H. Perrow

9,3 CARPENTERS

9,3,1 D. Faulds

9,4 BOILERMAKERS

9,4,1 J. Bosch

9,5 BLACKSMITHS

9,5,1 H. Rothman

9,6 TRANSPORT

9,6,1 C.J. Olivier

9,7 CRANES

9,7,1 W. Scheffer

10. COMPOUND

10,1 D.P. le Roux

11. CANTEEN

11,1 A.R. Moir

DUNSWART IRON AND STEEL WORKS, LIMITED

THE WAGES FUNCTION

MANUAL OF PROCEDURES, RESPONSIBILITIES AND METHODS

APPLICABLE TO - HOURLY PAID AND SALARIED PERSONNEL

C.A. 6.6.1973

DUNSWART IRON AND STEEL WORKS, LIMITEDTHE WAGES FUNCTIONMANUAL OF PROCEDURES, RESPONSIBILITIES AND METHODSAPPLICABLE TO - HOURLY PAID AND SALARIED PERSONNEL1. INTRODUCTION

The procedure is based on the principle of complete divorce of the function of transacting, recording and custodianship with independent departments responsible for the various facets of:-

- 1,1 Engagement
- 1,2 Dismissal
- 1,3 Recording of attendance: time clocks: timesheets
- 1,4 Compilation of data for computation
- 1,5 Drawing of cash
- 1,6 Enveloping and payment of earnings, balanced back to net amount of payroll prior to commencement of pay parades
- 1,7 Pay parades: at set times and at various locations in works to obviate idle time
- 1,8 Pay check identification: Company card issued to European when engaged; Bantu numerical armbands in addition disclose by clock number the area in which the Bantu is employed
- 1,9 Unclaimed wages: depositing and receipting on same day as payout; rebanking of cash; personal accounts; identification before paying claims
- 1,10 Control accounts: deductions; earnings
- 1,11 Source control statistics: functional labour complement and utilisation of ordinary time and overtime hours worked; ordinary and overtime pay; overtime premium;
- 1,12 Comparison of total earnings with budgets; highlighting variances in monthly management reports
- 1,13 Computerised European and Bantu payrolls: Complete records of each employee's personal and basic data stored; updating of data with each week's payrolls; storing and printing out weekly cumulative earnings, certain deductions and accrued leave shifts per employee
- 1,14 Unauthorised increases cannot be effected: duly authorised basic data amendment advice to computer required from Personnel Department or Bantu Liaison Officer

- 1,15 Automatic transfer to separate memory of basic and accumulated data when discharge advice given to computer
- 1,16 All data stored for duration of fiscal year, i.e. to end of February of each year: I.R.P. 5 certificates printed; accumulated earnings and deductions cleared; basic data re discharge personnel cleared; basic data re remaining personnel retained for new year
- 1,17 Total of P.A.Y.E. reflected on I.R.P. 5 certificates balanced back to total of tax deductions for the period and payments to Receiver of Revenue

DUNSWART IRON AND STEEL WORKS, LIMITEDTHE WAGES FUNCTIONMANUAL OF PROCEDURES, RESPONSIBILITIES AND METHODSAPPLICABLE TO - HOURLY PAID AND SALARIED PERSONNELI N D E X

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2083

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DATE ENJ 25 11 70
D B 1940

20 APR 1973

REA

RECEIVED PAY PRINTED OFF
ATTACHED COUNTERFOIL

PD-01000

HOURS (in Hours & Values) PER COST CENTRE				LEAVE	NIGHT	LEAVE PAY DUE		
COST CENTRE	HOURS	Rate		SHIFT	SHIFT			
		UNITS	D/C/L					
100	100							
869	869							
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DUNSWART IRON AND STEEL WORKS, LIMITEDPROGRAMME OF STOCKTAKING FOR 1972

PHYSICAL STOCK TO BE COUNTED			PHYSICAL STOCK COUNTED, MEASURED OR MASSED		
Month	Ledger	Commodity No.	Month	Ledger	Commodity No.
January	2	18/0 - 18/31	January	2	18/0 - 18/31
February	3	19/1 - 29/2 Alloys 26/1/1 - 26/1/8 Electrodes 34/0 - 34/10 Oil	February	3	19/1 to 29/2 26/1/1 to 26/1/18 34/0 to 34/10
March		20/1/1 - 21/50 Bricks 34/0 - 34/10 Oil	March		20/1/1 to 21/50 Bricks 34/0 to 34/10 Oil
April	4 + 5	31/1 - 53/4 + 54/1 - 57/6	April	4 + 5	31/1 - 53/4 + 54/1 - 57/6
May	6	62/1/1 - 26/9/1 Mill Rolls 20/1/1 - 21/50 Bricks 23/1 - 23/12 Alloys 19/3 - 19/23	May	6+	62/1/1 - 62/9/1 Mill Rolls 20/1/1 - 21/50 Bricks 23/1 - 23/12 Alloys 19/3 - 19/23
June	7	63/1 - 63/15 Mill Rolls Oil	June	7	62/1/1 - 62/9/1 Mill Rolls 34/0 - 34/10 Oil 63/1 - 63/15
July	8	77000 - 97000 20/1/1 - 21/50 Bricks 19/3 - 19/23 Alloys	July	8	62/1/1 - 62/9/1 Mill Rolls 19/3 - 19/23 Alloys 20/1/1 - 21/50 Bricks 77000 - 97000
August	1	2/1 - 17/- + Oil & Bricks	August	1	2/1 - 17/- 20/1/1 - 21/50 Bricks 34/0 - 34/0 Oil
September	2	18/0 - 18/31 + Mill Rolls	September	2	18/0 - 18/31
October	3	19/1 - 29/2 + Nozzles & Oil	October	3	19/1 - 19/23 Alloys 26/1/1 - 26/1/18 Electrodes 34/0 - 34/10 Oil
November		+ Oil + Mill Rolls	November		62/1/1 - 62/9/1 Mill Rolls 34/0 - 34/10 Oil
December	4 5	(31/1 - 53/4 (54/1 - 57/6 (20/1/1 - 21/50 Bricks (26/0 - 26/0/18 Electrodes (62/1/1 - 62/9/1 Mill Rolls			

DUNSWART IRON AND STEEL WORKS, LIMITEDSTOCKTAKING - YEAR ENDING 31ST DECEMBER, 1972RAW MATERIALS1. STOCKS TO BE TAKEN

1,1	Steel Scrap	}	Melting Shop Stock
1,2	Cast Iron Scrap		
1,3	Pig Iron		
1,4	Iron Ore		
1,5	Manganese Ore		
1,6	Iron Ore	}	Sponge Iron Plant Stock
1,7	Anthracite Coal		
1,8	Duff Coal		
1,9	Dolomite		

2. ESTIMATING

As it is not possible to determine the actual mass of these bulk commodities, the stocks will be estimated.

3. PROCEDURE

- 3,1 Each person delegated to assist in the stocktaking is to work independently, without divulging his estimates to others.
- 3,2 Each of the delegates will record on the attached summary sheet, in ink, the total of his estimate of each of the various types of stock.
- 3,3 The summary sheet must be signed by the person concerned.

4. DATE/TIME

- 4,1 Estimating of the stocks will commence at 0800 hours on Saturday, 30th December, 1972 and must be completed by the afternoon of the next day.
- 4,2 Each delegate will personally submit his results in a sealed envelope to Mr. C.L. Cartwright or his secretary, Mrs. G.J. Jackson by not later than 1600 Hours on 2nd January, 1973.
- 4,3 The envelope must be marked "Raw Material Stocks".

5. DELEGATES

Messrs:-

5,1	H. Herold	)	
5,2	A.R. Moir	)	
5,3	F.J. Lehman	)	
5,4	L.S. Connellan	)	
5,5	J.S. van Wyk	)	
5,6	A. van Bergen	)	Melting Shop Stock
5,7	J. Bird	)	
5,8	C.J. v.d. Berg	)	
5,9	D.M. O'Brien	)	
5,10	H.B. Steyn	)	
5,11	E.E. Fisher	)	
5,12	L.G. Hurly	)	
5,13	J.J. le Grange	)	
5,14	L.J. Fisher	)	
5,15	C. Durrheim	)	Sponge Iron Plant Stock
5,16	A. Dalrymple	)	
5,17	N.L.G. Lourens	)	

6. MESSRS. PEAT, MARWICK, MITCHELL & CO., HAVE BEEN ADVISED OF THE STOCKTAKING AND WILL HAVE ONE OR MORE REPRESENTATIVES PRESENT WHEN THE ESTIMATES ARE MADE.

7. The independent annual survey of the scrap and pig iron heaps by Messrs. Gillespie, Archibald and partners has been arranged by Mr. H. Herold. When completed Scrap Survey Certificates will be distributed to the auditors and the Holding companies as arranged.


C.F.O. RADEMAN
CHIEF ACCOUNTANT

Kopieë van hierdie is ook verkrygbaar in Afrikaans

19.12.1972

DUNSWART IRON AND STEEL WORKS, LIMITEDSTOCKTAKING - YEAR ENDING 31ST DECEMBER, 1972ESTIMATES OF RAW MATERIAL STOCKS

I, the undersigned, estimate that the stocks of Raw Materials as at 31st December, 1972 are as follows:-

	<u>METRIC TONS</u>
A. <u>MELTING SHOP STOCK</u>	
Steel Scrap	_____
Cast Iron Scrap	_____
Pig Iron	_____
Iron Ore	_____
Manganese Ore	_____
 B. <u>SPONGE IRON PLANT STOCK</u>	
Iron Ore	_____
Anthracite Coal	_____
Duff Coal	_____
Dolomite	_____

NAME OF ESTIMATOR_____
HIS SIGNATURE_____
DATE

DUNSWART IRON AND STEEL WORKS, LIMITEDSTOCKTAKING - YEAR ENDING 31ST DECEMBER, 1972CONSUMABLE STORES1. GENERAL

- 1,1 Stocktaking of all consumable stores is based on a perpetual inventory system with monthly counts in terms of the current annual program.
- 1,2 Pre-printed stock sheets, reflecting commodity codes and brief descriptions, are used for this purpose and quantities determined at stocktaking, after cut-offs adjustments, are reflected against the relevant codes.
- 1,3 Physical and theoretical mechanised inventories are compared, resultant discrepancies, both positive and negative, reconciled and accounted for, and stock adjustment requisitions compiled to rectify the theoretical mechanised inventory.
- 1,4 Relevant stock adjustments, duly authorised, are/were effected during the year in terms of the predetermined program of stocktaking.

2. SCOPE - YEAR END

The consumable stores to be counted, measured or massed as at 31st December, 1972 are:-

<u>Mechanised Stock Ledger No.</u>	<u>Commodity Code Number</u>	
	<u>From</u>	<u>To</u>
No. II	20/1/1	21/50
No. III	26/0	26/0/18
No. IV	31/1	53/4
No. V	54/1	57/6
No. VI	I 62/1/1	62/1/14
	(62/3/1	62/3/11
	(62/9/1	-

3. PROCEDURE

- 3,1 The stocktaking is to be undertaken by teams comprising 3 (three) members each:-
 - 3,1,1 One person to identify the commodity concerned, and to ensure that all the relevant stocks are counted.

- 3,1,2 One person to count and enter the quantity on the stock sheet against the relevant pre-printed commodity code.
- 3,1,3 One person to check the count of the stock and agree the quantity with the person entering it on the stock sheet.

3,2 Each stock sheet must be signed by every member of the team.

4. DELEGATES

The personnel required to attend are:-

Messrs:-

- | | | |
|-----|-----------------|--------------------|
| 4,1 | F.J. Joubert | General Supervisor |
| 4,2 | G.G.L. Venter | |
| 4,3 | J. Darroch | |
| 4,4 | J. Matthee | |
| 4,5 | J. v.d. Berg | |
| 4,6 | M. de Witt | |
| 4,7 | P. Rossouw | |
| 4,8 | W. Brocklehurst | |
| 4,9 | J. Guild | |

5. DATE/TIME/TEAM MEMBERS

31st December, 1972

- | | |
|-----------|--|
| 7,00 a.m. | <u>Mechanised Stock Ledger No. II</u>
Commodities from No. 20/1/1 to 21/50
Messrs. Rossouw, v.d. Berg and De Wit and Guild |
| 7,00 a.m. | <u>Mechanised Stock Ledger No. III</u>
Commodities 26/0 - 26/0/18
Messrs. Connellan, Botha and Darroch |
| 7,00 a.m. | <u>Mechanised Stock Ledger No. IV</u>
Commodities 31/1 - 53/4
Messrs. Venter and Matthee |
| 7,00 a.m. | <u>Mechanised Stock Ledger No. V</u>
Messrs. Venter, and Matthee |

22nd December, 1972

- | | |
|-----------|--|
| 8,00 a.m. | <u>Mechanised Stock Ledger No. VI</u>
Commodities from No. 62/1/1 to 62/1/14
No. 62/3/1 to 62/3/11 and
No. 62/9/1
Messrs. Joubert and Brocklehurst |
|-----------|--|

6. MESSRS. PEAT, MARWICK, MITCHELL & CO. HAVE BEEN ADVISED OF THE STOCKTAKING AND WILL HAVE REPRESENTATIVES PRESENT DURING THE STOCK COUNTS.



C.F.O. RADEMAN
CHIEF ACCOUNTANT

15.12.1972

Kopieë van hierdie is ook verkrygbaar in Afrikaans

DUNSWART IRON AND STEEL WORKS, LIMITEDSTOCKTAKING - YEAR ENDING 31ST DECEMBER, 1972SEMI-FINISHED PRODUCTS - INGOTS AND BILLETS1. GENERAL

The Head of the Quality Control Section or his deputy will be responsible for:-

- 1,1 Stacking of all products prior to stocktaking, in a manner which will facilitate counting.
- 1,2 Identification and classification of the different products and their metal types.
- 1,3 Removal of scrapped products from the stock area, or clearly marking such products where, in exceptional instances, it is not possible to remove it from the stocktaking area prior to the commencement of the stock count.
- 1,4 Ensuring that all stocks are counted, measured or massed.
- 1,5 Demarcation of defined stock areas in which the individual teams are to operate.

2. DATE/TIME

The actual stock count of both Ingots and Billets will be undertaken on Saturday, 30th December, 1972 commencing at 0815 hours and must be completed not later than 1200 hours the same day.

3. TEAMS

- 3,1 Three teams are appointed to expedite the count of this stock.
- 3,2 The personnel required are:-
 - 3,2,1 The Head of the Quality Control Section or his deputy and 5 (five) assistants.
 - 3,2,2 3 (three) persons delegated by Management.
- 3,3 Each team will comprise:-
 - 3,3,1 Two persons from Quality Control
 - 3,3,2 One person delegated by Management
- 3,4 Team members will meet at the Laboratory at 0800 hours on Saturday, 30th December, 1972.
- 3,5 See item 5 for names of team members.

4. PROCEDURE

- 4,1 Each team will operate in a defined stocktaking area as indicated by the Head of

the Quality Control Section or his deputy and each member will independently count each stack within the given area.

- 4,2 The independent results per stack must be mutually agreed before proceeding to the next stack.
- 4,3 Upon completion of and agreeing the team's stocktaking results of each stack, one member of the team will record the quantity, size and mass per unit on the stock sheet while another member of the team will mark the stack with a suitable medium to obviate a duplication of the count. Each team is to use a different colour of marking medium. (To be provided by Quality Control).
- 4,4 Each stack must be numbered and this number must be reflected on the stock sheet against the relevant stock entry.
- 4,5 INGOTS

4,5,1 Counting is to commence as soon as possible after 0815 hours on Saturday, 30th December, 1972 in the area where production ceases first, i.e. in the Casting Bay or the 30" Mill Soaking Pit Bay.

4,5,2 The count must include:-

4,5,2,1 Ingots still in moulds in the Casting Bay

4,5,2,2 Ingots in the 30" Mill Soaking Pits.

The quantities must be ascertained from the responsible Melt Shop and Rolling Mills Officials.

4,5,3 Ingots are in 3 (three) different sizes:-

4,5,3,1 Extra Large - 1 905 kg. Each

4,5,3,2 Large - 1 343 kg. Each

4,5,3,3 Medium - 907 kg. Each

The stock count of the different sizes must be recorded separately on the stock sheets.

4,5,4 Testing of the mass of Ingots will be carried out at the discretion of the Auditors, but in the main the stocks will be calculated at the given mass.

4,6 BILLETS

4,6,1 Counting of Billets is to commence immediately the count of Ingots is completed.

4,6,2 The count must include:-

4,6,2,1 Billet stocks held at the Blacksmiths Shop.

4,6,2,2 Billets in Mills Reheating Furnaces (obtain quantities from responsible Mill Officials).

4,6,3 Due to fluctuating tolerances in billet sizes, these sizes (and metal types) are to be given by Quality Control and recorded accordingly. The counters will, however, test the sizes so given.

4,6,4 Testing of the mass of Billets will be carried out at the discretion of the Auditors, but in the main, due to the varying tolerances, the stocks will be calculated at the mass per billet to be provided by Quality Control and which must be marked on each stack.

In exceptional instances, where the mass is not provided, stocks will be calculated as follows:-

<u>mm²</u>	<u>kg/m</u>
66	33
69	36
73	40
82	51
89	60
95	68
98	73
100	76
110	92
115	100
120	107
125	118
135	138
140	149
145	159
150	168
<u>OTHER</u>	
145 x 64	69

The mass per unit for any size of billet not listed, will be obtained from the Mills Manager.

5. TEAM MEMBERSQUALITY CONTROL

Messrs:-

M.P. v.d. Merwe

M. Potgieter

A. Massyn

F. Maritz

J. Klopper

K. Nortje

DELEGATED BY MANAGEMENT

K. Borowski

E. Fullard

E. Wilkins

6. MESSRS. PEAT, MARWICK, MITCHELL AND CO., HAVE BEEN ADVISED OF THE STOCKTAKING AND WILL HAVE ONE OR MORE REPRESENTATIVES ATTENDING THE COUNTS.



C.F.O. RADEMAN
CHIEF ACCOUNTANT

Kopieë van hierdie is ook Verkrygbaar in Afrikaans

19.12.1972

DUNSWART IRON AND STEEL WORKS, LIMITEDSTOCKTAKING - YEAR ENDING 31ST DECEMBER, 1972FINISHED PRODUCTS - SECTIONS AND BARS1. GENERAL

- 1,1 The Head of the Despatch Section will, prior to stocktaking, make very endeavour to stack and label all finished products in a manner which will facilitate counting or estimating.
- 1,2 Where possible, the mass of stacks or bundles of finished sections must be determined and be recorded on the labels.
- 1,3 All stocks of slow moving products must, as far as possible, be transferred to the new stockyard area where stacking and labelling can be effected prior to stocktaking.

2. DATE/TIME

- 2,1 Rolling and Finishing mills cease production at 1400 hours on 23rd December, 1972 and resumes production at 0600 hours on 2nd January, 1973.
- 2,2 All stocks of finished products - sections and bars - will be counted, massed, measured and estimated on Sunday, 31st December, 1972 commencing 0800 hours. All counting and recording to be completed by not later than 1500 hours on the same day.

3. TEAMS

- 3,1 The stocktaking will be undertaken by 4 (four) teams.
- 3,2 The personnel required are:-
 - 3,2,1 The Head of the Despatch Section and 4 (four) Despatch Assistants.
 - 3,2,2 The Commercial Manager and 2 (two) Sales Department Assistants.
 - 3,2,3 2 (two) Accounts Department Assistants.
- 3,3 Each team will comprise 2 (two) members:-
 - 3,3,1 One from the Despatch Section.
 - 3,3,2 One from the Accounts or the Sales Departments.
- 3,4 See item 6 for names of team members.

4. PROCEDURE

- 4,1 Where the actual mass of stacks or bundles of products was not determined

prior to stocktaking, it must be determined, where possible, at stocktaking and be estimated only in instances where it is physically impossible to do otherwise.

- 4,2 Each team will operate in a defined stocktaking area, as indicated by the Head of the Despatch Section and each member will independently count or estimate each stack or bundle within the given area.
- 4,3 The independent results per stack or bundle must be mutually agreed by the members of the team before proceeding to the next stack.
- 4,4 Upon completion of, and agreeing the team's results per stack, one member of the team will record the agreed mass on the stock sheet, while the other member of the team will mark the stack with a suitable medium to obviate duplication. Each team is to use a different colour of marking medium. (To be provided by Despatch Department.)
- 4,5 Each stack or bundle must be numbered and this number must be reflected on the stock sheet against the relevant stock entry.

5. GRADING OF STOCKS

- 5,1 Immediately the stocktaking within each defined area is completed, the Commercial Manager and the Head of the Despatch Section will accompany the team responsible for that area to grade all the counted and numbered stacks.
- 5,2 The grading of stacks will be as follows:-
 - 5,2,1 Grade "A" Sections and Bars deemed to be saleable at normal accepted selling price.
 - 5,2,2 Grade "B" Sections and Bars deemed to be saleable only at prices below the normal accepted selling price, but not below cost price.
 - 5,2,3 Grade "C" Sections and Bars deemed to be saleable only at prices below cost price.
- 5,3 As each stack is graded, a member of the team will record the grading on the stock count sheet against the relevant stack number, as recorded at the time of the actual count.
- 5,4 Any stacks which may have been missed during the actual stock count should automatically be 'picked up' during grading.

6. TEAM MEMBERSDESPATCH DEPARTMENTACCOUNTS DEPARTMENTSALES DEPARTMENT

Messrs:-

E.E. Fisher

K. Allen

L.G. Hurly

P. Joubert

G.P. v.d. Berg

C. de la Hunt

P.J. Nortje

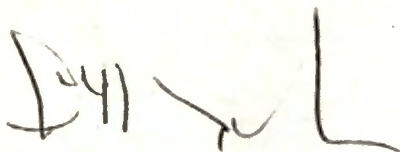
G. v. Rensburg

M.J. du Preez

J.W. Donaldson

Team members will meet at the Accounts General Office at 0730 hours on Sunday,
31st December, 1972.

7. MESSRS. PEAT, MARWICK, MITCHELL AND CO., HAVE BEEN ADVISED OF THE STOCKTAKING AND
WILL HAVE ONE OR MORE REPRESENTATIVES ATTENDING THE COUNTS.



C.F.O. RADEMAN
CHIEF ACCOUNTANT

Kopieë van hierdie is ook verkrygbaar in Afrikaans

19.12.1972

EUROPEAN NORMAL TIME AND OVERTIME HOURS WORKED FOR WEEK ENDED 3.7.1973

FUNCTIONAL AREA		NORMAL TIME			OVERTIME			TOTAL HOURS	OVERTIME PREMIUM
ODE	DESIGNATION	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED		
67	Other Debtors								
84	Gas Producer Plant	3	38,66	116,00	3	27,00	81,00	197,00	51,00
123	Roll Turning	13	44,53	579,00	13	30,85	401,15	980,15	303,42
124	Mills Tackle	1	39,20	39,20	1	6,40	6,40	45,60	2,56
139	Billet Yard	9	42,50	382,50	9	20,80	187,20	569,70	96,70
140	Electric Welding								
141	Cranes Overhead	84	38,01	3 193,50	80	30,98	2 479,00	5 672,50	1 390,48
142	Works Transport	12	39,66	476,00	11	23,28	256,16	732,16	133,64
143	Mobile Equipment	2	45,00	90,00	2	48,25	96,50	186,50	60,87
144	Laboratory	15	41,44	621,60	15	30,02	450,33	1 071,93	235,17
146	Straightening and Grinding	5	38,60	193,00	4	27,20	108,87	301,87	53,83
364	Blacksmiths	6	36,91	221,50	2	9,87	19,75	241,25	14,75
365	Bricklayers	4	31,00	124,00	3	12,83	38,50	162,50	32,24
366	Carpenters and Painters	4	45,00	180,00	4	16,00	64,00	244,00	44,91
867	Electricians	40	42,81	1 712,75	30	24,12	723,63	2 436,38	511,43
868	Fitters, Turners, Boiler-makers, Platelayers, Riggers, Welders	58	39,36	2 283,18	45	19,07	858,31	3 141,49	667,70
869	Greasers	4	44,57	178,30	3	13,04	39,14	217,44	27,75
870	Machine Shop	14	42,85	599,90	12	8,43	101,27	701,17	61,19
		X	X	5 299,63	X	X	1 844,60	7 144,23	1 359,97
887	Straightening T.M.B. & G.B.	1	46,00	46,00	1	29,20	29,20	75,20	18,31
990	Unloading Raw Material	2	41,83	83,66	2	27,17	54,34	138,00	25,87
991	Works Railway								
993	Scrap Preparations - Own								
	NOTE:								
	A NORMAL TIME WEEK CONSISTS OF 45 WORKING HOURS								
	CONTINUED:								

FUNCTIONAL AREA		NORMAL TIME			OVERTIME			TOTAL HOURS	OVERTIME PREMIUM
CODE	DESIGNATION	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED		
	<u>MELTSHOP</u>								
00	Scrap Yard	11	38,48	423,33	11	18,54	204,00	627,33	106,40
00	Furnaces	29	36,03	1 044,98	26	15,82	411,36	1 456,34	236,91
00	Ladle Maintenance								
00	Casting Bay	23	34,93	803,47	23	25,13	577,99	1 381,46	289,14
		X	X	2 271,78	X	X	1 193,35	3 465,13	632,45
	<u>ROLLING MILLS</u>								
00	General	2	46,00	92,00	2	13,55	27,10	119,10	11,92
	<u>30" COGGING MILL</u>								
00	Gas Soaking Pits	1	46,00	46,00	1	26,00	26,00	72,00	17,87
00	Rolling	12	43,10	517,20	12	24,91	299,00	816,20	167,33
00	Elpit	1	46,00	46,00	1	28,50	28,50	74,50	21,29
		X	X	701,20	X	X	380,60	1 081,80	218,41
	<u>22"/18" MILL</u>								
00	Reheating Furnace	2	46,00	92,00	2	39,25	78,50	170,50	56,91
00	Rolling Trains - 1 & 2	5	46,00	230,00	5	21,86	109,31	339,31	56,96
00	- 3 & 4	22	41,75	918,60	22	19,91	438,03	1 356,63	222,03
00	Cooling Bed	5	39,24	196,20	5	16,25	81,25	277,45	28,74
		X	X	1 436,80	X	X	707,09	2 143,89	364,64
	<u>MEDIUM 12" MILL</u>								
00	Reheating Furnace	1	46,00	46,00	1	21,80	21,80	67,80	16,69
00	Rolling	7	41,43	290,03	6	21,75	130,50	420,53	88,65
00	Cooling Bed	2	42,80	85,60	2	13,15	26,30	111,90	12,70
		X	X	421,63	X	X	178,60	600,23	118,04
	CONTINUED:								

FUNCTIONAL AREA		NORMAL TIME			OVERTIME			TOTAL HOURS	OVERTIME PREMIUM
IDE	DESIGNATION	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED		
	<u>18"/12"/11" SIEMAG MILL</u>								
10	Reheating Furnace	2	46,00	92,00	2	29,50	59,00	151,00	37,69
20	Roughing Train	8	42,58	340,70	8	27,40	219,20	559,90	136,66
40	Rolling Train	11	42,46	467,16	10	20,41	204,16	671,32	109,65
60	Cooling Bed	11	41,66	458,30	11	19,95	219,50	677,80	96,75
		X	X	1 358,16	X	X	701,86	2 060,02	380,75
		X	X	6 189,57	X	X	3 161,50	9 351,07	1 714,29
00	<u>MILLS DESPATCH</u>	2	46,00	92,00	2	25,25	50,50	142,50	34,54
10	<u>RECURTING/RECLAMATION</u>								
00	<u>CONTINUOUS CASTING PLANT</u>	10	42,16	421,62	10	17,80	178,01	599,63	92,15
00	<u>SPONGE IRON PLANT</u>	7	39,81	278,67	7	28,26	197,83	476,50	134,47
	<u>OTHER</u>								
	TOTAL	451	40,13	18 101,95	409	23,42	9 582,59	27 684,54	5 707,28

DUNSWART IRON AND STEEL WORKS, LIMITEDNORMAL AND OVERTIME HOURS WORKED FOR WEEK ENDED 3.7.1973

	WEEK ENDING	MONTH TOTAL
Normal Hours	18 101,95	
Overtime Hours	9 582,59	
Normal Value	21 552,61	
Overtime Value	17 546,06	
Total Value	39 098,67	
Shift Premium	1 479,63	
Bonuses	4 994,15	
Leave Pay	2 650,33	
Paid Holidays	0,00	
TOTAL	48 222,78	

Acc's 5/7/1973

DUNSWART IRON AND STEEL WORKS, LIMITED

EUROPEAN NORMAL TIME AND OVERTIME HOURS WORKED FOR MONTH ENDED 30.6.1973

FUNCTIONAL AREA		NORMAL TIME			OVERTIME			TOTAL HOURS	OVERTIME PREMIUM
CODE	DESIGNATION	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED		
167	Other Debtors								
184	Gas Producer Plant	3	186,00	558,00	3	138,33	415,00	973,00	257,58
823	Roll Turning	13	173,07	2 250,00	13	129,90	1 688,76	3 938,76	1 276,15
824	Mills Tackle	1	183,20	183,20	1	97,80	97,80	281,00	50,68
839	Billet Yard	13	132,92	1 728,00	12	86,94	1 043,38	2 771,38	560,73
840	Electric Welding								
841	Cranes Overhead	112	112,40	12 589,30	110	100,27	11 030,39	23 619,69	6 245,81
842	Works Transport	13	135,78	1 765,15	13	68,72	893,40	2 658,55	444,43
843	Mobile Equipment	2	181,25	362,50	2	173,50	347,00	709,50	219,09
844	Laboratory	17	150,33	2 555,70	17	125,00	2 125,01	4 680,71	1 104,26
846	Straightening and Grinding	6	110,40	662,40	6	63,37	380,27	1 042,67	186,56
864	Blacksmiths	6	128,41	770,50	4	21,76	87,05	857,55	62,52
865	Bricklayers	4	129,37	517,50	4	65,10	260,42	777,92	204,01
866	Carpenters and Painters	5	138,60	693,00	5	74,94	374,72	1 067,72	273,90
867	Electricians	45	155,93	7 016,97	42	73,01	3 066,42	10 083,39	2 293,02
868	Fitters, Turners, Boiler-makers, Platelayers, Riggers, Welders	63	149,00	9 386,96	53	82,77	4 387,26	13 774,22	3 513,35
869	Greasers	4	188,12	752,50	3	81,11	243,33	995,83	149,84
870	Machine Shop	17	149,74	2 545,70	15	31,57	473,59	3 019,29	290,47
		X	X	21 683,13	X	X	8 892,79	30 575,92	6 787,11
887	Straightening T.M.B. & G.B.	1	184,00	184,00	1	106,93	106,93	290,93	66,06
990	Unloading Raw Material	3	142,66	427,98	3	158,00	474,01	901,99	253,61
991	Works Railway								
993	Scrap Preparations - Own								
	NOTE:								
	A NORMAL TIME MONTH CONSISTS OF 200 WORKING HOURS ON AVERAGE								
	CONTINUED:								

FUNCTIONAL AREA		NORMAL TIME			OVERTIME			TOTAL HOURS	OVERTIME PREMIUM
CODE	DESIGNATION	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED	NO. OF EMPL'S	AVE. NO. OF HOURS WORKED	TOTAL NO. OF HOURS WORKED		
	<u>MELTSHOP</u>								
00	Scrap Yard	11	132,52	1 457,73	11	56,38	620,27	2 078,00	324,36
00	Furnaces	37	86,87	3 214,32	34	54,64	1 857,95	5 072,27	1 077,55
00	Ladle Maintenance								
00	Casting Bay	31	126,97	3 936,33	31	70,50	2 185,80	6 122,13	1 148,07
		X	X	8 608,38	X	X	4 664,02	13 272,40	2 549,98
	<u>ROLLING MILLS</u>								
00	General	2	184,00	368,00	2	83,70	167,40	535,40	86,60
	<u>30" COGGING MILL</u>								
10	Gas Soaking Pits	1	184,00	184,00	1	154,00	154,00	338,00	112,27
20	Rolling	14	164,12	2 297,80	14	92,81	1 299,47	3 597,27	744,97
30	Elpit	1	184,00	184,00	1	152,40	152,40	336,40	123,72
		X	X	3 033,80	X	X	1 773,27	4 807,07	1 067,56
	<u>22"/18" MILL</u>								
10	Reheating Furnace	2	184,00	368,00	2	149,05	298,10	666,10	204,81
20	Rolling Trains - 1 & 2	5	180,32	901,60	5	98,33	491,68	1 393,28	270,09
30	- 3 & 4	21	171,58	3 603,26	21	91,69	1 925,52	5 528,78	1 100,64
40	Cooling Bed	10	63,76	637,60	10	36,88	368,82	1 006,42	152,06
		X	X	5 510,46	X	X	3 084,12	8 594,58	1 727,60
	<u>MEDIUM 12" MILL</u>								
10	Reheating Furnace	1	184,00	184,00	1	134,80	134,80	318,80	101,94
20	Rolling	7	175,17	1 226,23	7	104,53	731,75	1 957,98	512,82
30	Cooling Bed	2	184,00	368,00	2	104,93	209,86	577,86	128,38
		X	X	1 778,23	X	X	1 076,41	2 854,64	743,14
	CONTINUED:								

26 346,35

DUNSWART IRON AND STEEL WORKS, LIMITEDNORMAL AND OVERTIME HOURS WORKED FOR MONTH ENDED 30.6.1973

	WEEK ENDING	MONTH TOTAL
Normal Hours		72 915,82
Overtime Hours		42 992,33
Normal Value		87 446,45
Overtime Value		80 227,67
Total Value		167 674,12
Shift Premium		6 213,38
Bonuses		24 093,98
Leave Pay		12 424,69
Paid Holidays		8 635,24
TOTAL		219 041,41

Acc's 4/7/1973

DUNSWART IRON AND STEEL WORKS, LIMITEDBANTU OVERTIME WORKED AND PAID -PAYROLL WEEK : 10TH AUGUST, 1971 - 16TH AUGUST, 1971

1	2	3	4	5	6	7
Interval (Overtime Hours Worked)	Number of Bantu	Total Overtime Hours Worked	Average Over- time Hours Worked Per Bantu	Overtime Remuneration	Average Overtime Remunera- tion Per Bantu	
					Total	Per Hour
				R	R	R
1 - 10	371	1 855	5	531	1	0,29
11 - 20	225	3 612	16	1 031	5	0,29
21 - 30	219	5 603	26	1 592	7	0,29
31 - 40	171	6 085	35	1 772	10	0,29
41 - 50	64	2 856	45	838	13	0,29
51 - 60	30	1 689	56	497	17	0,29
61 - 70	22	1 400	64	408	19	0,29
71 - 80	3	225	75	66	22	0,29
81 +	1	88	88	28	28	0,32
	1 106	23 413	21	6 763	6	0,29

This schedule must be read in conjunction with the notes attached hereto.

C.A. 27/8/71

THIS FORMS PART, AND MUST BE READ IN CONJUNCTION WITH THE TABLE ATTACHED.

NOTES:

1. Data used in this frequency, etc. table is based, derived and interpreted from computerised payroll for test period.
2. All overtime hours used are unconverted hours.
3. Statutory shift premium, although not material has been excluded from the majority of calculations.

4. Normal Hours Worked	49 938
Normal Hours remuneration	R11 281
Average remuneration per normal hour	R0,23
Overtime Hours worked	23 413
Overtime Hours Remuneration	R6 212
Average remuneration per overtime hour	R0,27
Average overtime premium per hour	R0,04

i.e. $\pm 2\%$

5. Total overtime hours worked as a percentage of normal hours worked 47%
6. Overtime hours worked consists of:-

Rate 1 (Ordinary)	14 181 hours
Rate 2 (Special) Sundays etc.	6 764 hours
7. Overtime remuneration as a percentage of total gross earnings payroll 36%
8. Overtime remuneration as a percentage of normal time payroll 48%

9. ABBREVIATED OBSERVATIONS:

9-1 On Average

For every normal hour worked each Bantu employee works $\frac{1}{2}$ hour overtime.

9-2 There appears to be a distortion in the overtime pattern as follows:-

9-2-1 34% of the total Bantu labour force worked only 8% of the total overtime hours whereas the balance of 66% must then have worked 92% of the overtime.

With regards overtime hours worked both the median and the mode would appear to fall within the categories 21 - 40 hours overtime hours worked per week.

This special investigation in many ways is but a summary of the detailed normal and overtime hours statistics compiled and distributed weekly.

WHITE AND BANTU PERSONNEL AS AT 26.6.1973

	WHITE				BANTU	
	Daily Paid	Staff	TOTAL	Budget	Daily Paid	Budget
<u>MELT SHOP AREA:</u>						
Scrap Yard	17	3	20	9	51	109
Melters	28		28	35	175	181
Ladle men/Pitmen	25	1	26	17	13	11
Oxygen Plant						3
Brick Store						
Crane Drivers:						
i) Scrap Yard)				49		
ii) Melt Shop)	64		64			
iii) Casting Bay)						
Clerks/Supervision		5	5	4		
TOTAL:	134	9	143	114	239	304
<u>CONTINUOUS CASTING PLANT</u>	10	4	14		52	
<u>SPONGE IRON PLANT</u>	8	3	11		35	
<u>ROLLING MILLS AREA:</u>						
a) <u>30" Cogging Mill</u>						
i) Soaking Pit	2		2	6	10	10
ii) Rollers/Asst. Rollers	4		4	4		
iii) Mill Operators	6		6	4		
iv) Shears/Cooling Bed	5		5	6	13	14
b) <u>18/22" Mill</u>						
i) Re-heating Furnace	2		2	2	17	16
ii) Rollers/Asst. Rollers	4		4	4		
iii) Mill Operators	22		22	18	26	24
iv) Yardmen and Charging				2		4
c) <u>Medium 12" Mill</u>						
i) Re-heating Furnace	3		3	2	14	14
ii) Rollers	4		4	4		
iii) Mill Operators				10	51	46
iv) Yardmen and Charging				2		4
d) <u>Stemaq</u>						
i) Re-heating Furnace	2		2	2	14	12
ii) Rollers/Asst. Rollers/Leaners	6		6	5		
iii) Mill Operators	15		15	14	44	48
iv) Yardmen and Charging				2		4
v) Scrap Cutting						2

e) Bossboysf) General

- i) Billet Yard/Stock Yard Supervisor
- ii) Chipping of Billets
- iii) Mill Scrap Handling
- iv) Office/Cabins/Tackle
- v) Roll Turners
- vi) Roll Tuners - Apprentices
- vii) Crane Drivers
- viii) Supervision/Clerks
- xi) Scrap Cutting

TOTAL:MILLS DESPATCH

Clerks/Supervision

Transport Loading

Straightening Machines

Office Cleaners/Messengers

Recutting

Weighbridge

New Despatch Area

Cooling Bed/Shears:-

- i) Medium 12" Mill
- ii) 18/22" Mill
- iii) Stomag Mill

TOTAL:LABORATORY

General

Chemical Laboratory

Quality Control

TOTAL:ENGINEERING DEPARTMENTBrick StoreBlacksmiths

Blacksmiths - Apprentices

Bricklayers

Bricklayers - Apprentices

Carpenters and Painters

Electricians

Electricians - Apprentices

Daily Paid	Staff	TOTAL	Budget	Daily Paid	Budget
				2	2
11		11	1	17	6
				13	13
				12	13
3	1	4	1	7	4
9	3	12	10	6	5
2		2	2		
21		21	21		
	8	8	8		
					1
121	12	133	130	246	242
	4	4	4		
7		7	4	16	16
5		5	6	46	49
					3
1		1	1	14	9
			1		
1		1	2	8	8
4		4	4	37	36
2		2	4	25	24
3		3	4	19	18
23	4	27	30	165	163
	3	3		32	16
8	5	13	12		
7	4	11	26		
15	12	27	38	32	16
	1	1			
5	1	6	6	26	26
1		1	2		
2	2	4	12	32	33
			2		
5	1	6	5	12	14
21	5	26	30	36	24
17		17	16		

	Daily Paid	Staff	TOTAL	Budget	Daily Paid	Budget
<u>Fitters and Turners</u>	37	5	42	37	70	53
Fitters and Turners - Apprentices	16		16	17		
<u>Boilermakers</u>	6	1	7	8	14	16
Boilermakers - Apprentices	6		6	8		
Riggers	2		2	2	9	13
Tracklayers/Sweepers				1	6	7
Greasers/Compressors/Saws	5		5	4	16	13
Machinists	3		3	5		
<u>Instrument Mechanics</u>	3	2	5	2		
Instrument Mechanics - Apprentices	2		2	3		
Gas Producers	3	1	4	5	31	28
<u>Welders</u>	4		4	2		
Welders - Apprentices				1		
<u>Motor Mechanics</u>	1	1	2	3		
Motor Mechanics - Apprentices				1		
Lorry Drivers/Other Transport	9		9	10	33	22
Dam Pumps					3	2
Engineers		4	4	2		
Engineers Clerks		1	1	1		
Cranes Foreman		1	1	1		
TOTAL:	148	26	174	186	288	251
<u>GENERAL:</u>						
a) <u>Works Services</u>						
i) Drawing Office/Projects		9	9	8	2	2
ii) Purchase Department		2	2	2		1
iii) Works Security (*See Note 1 - p. 4)		9	9	8*	31	31*
iv) Stores Area		10	10	9	12	10
b) <u>Welfare Services</u>						
i) Personnel/Apprentice Superv.				1		
ii) Bantu Welfare Officer					1	2
iii) Beer Sales - Compound					1	1
iv) Kitchen/Boiler - Compound					5	5
v) Changehouse - Compound					1	1
vi) Clerks - Compound					3	2
vii) Administration - Compound					3	6
viii) Cleaners/Convalescents					18	5
ix) Coffee Machines						2
x) Compound Manager/Chief Security Off.		2	2	1		
xi) European Changehouse				1	3	4
xii) First Aid Stations		2	2	1	3	5

	Daily Paid	Staff	TOTAL	Budget	Daily Paid	Budget
c) <u>Administration Services</u>						
i) <u>Accounts Department</u>						
System Trainees		3	3			
Financial Accounting		6	6	16		
Machinists		4	4	9		
Time Office		4	4	8	8	8
Typing/Invoicing		4	4	5		
Costing		3	3	11		
ii) <u>Medical Aid</u>		3	3	3		
iii) <u>Kitchen Supervisor</u>		1	1	1		
iv) <u>Switchboard</u>		1	1	1		
v) <u>Managerial</u>		9	9	5		
vi) <u>Johannesburg Office</u>		2	2	1		
vii) <u>Main Office Cleaners, etc.</u>					15	13
d) <u>Other Services</u>						
i) <u>Sales Department</u>		8	8	13		
ii) <u>Railway Siding</u>		1	1	1		
<u>TOTAL:</u>		83	83	105	106	98
<u>GRAND TOTAL:</u>	459	153	612	603	1 163	1 074

Labour for Contractors						
------------------------	--	--	--	--	--	--

NOTES: 1. Security Personnel Budget Increase.

1,1 3 Bantu - Sponge Iron Plant - from September, 1972.

1,2 3 European and 5 Bantu - general - from November, 1972.

Acc's 29/6/1973

RN/EM

9/71

DUNSWART IRON AND STEEL WORKS, LIMITED

ABSENTEEISM - WEEK ENDED 26.6.1973

77

ANNEXURE 11,3 (v)

	SICK, ETC.		ABSENTEES		WORKING STRENGTH		ACTUAL STRENGTH		FOR PERIOD ON LEAVE	
	White	Bantu	White	Bantu	White	Bantu	White	Bantu	White	Bantu
Rolling Mills	2		4	22	100	246	106	268	2	11
Despatch			1	12	23	165	24	177	2	2
Engineering	6		5	13	148	288	159	301	10	10
Crane Drivers	5		6		85		96		2	
Melt Shop	2		1	11	70	239	73	250	2	3
Continuous Casting Plant				2	10	52	10	54		2
Sponge Iron Plant				2	8	35	8	37	1	
Laboratory				2	15	32	15	34		
Other				1		106		107		2
TOTAL:	15		17	65	459	1 163	491	1 288	19	30

Labour for Contractors										
------------------------	--	--	--	--	--	--	--	--	--	--

Abs - Absent

M/C - Off Sick - Medical Certificate Supplied

Mtg - Military Training

AWP - Absent with Permission

IOD - Injured on Duty

UPL - Unpaid Leave

ABSENTEEISM - WEEK ENDED 26.6.1973

Department	Co. No.	Name	Wed	Thu	Fri	Sat	Mon	Tue
MILLS	30	O.R. NIEWENHUIZEN	AWP					
	37	E.C. DUGTIG	M/C	M/C	M/C		M/C	M/C
	105	N.W.P. KANNEMEYER			A			
	1024	A.P. VAN WYK					AWP	
	2122	E.J. HOLTZHAUSEN			A			
	7534	J.J. BEKKER		AWP				
	7588	M.N. DA COSTA	MTG	MTG	MTG		MTG	
	7609	D. APPELCRYN	MTG	MTG	MTG		MTG	MTG
	7610	S.G.N. VAN TONDER	MTG	MTG	MTG		MTG	MTG
	7620	K.G. KOTZE	MTG	MTG	MTG		MTG	MTG
	7637	A.G. WRIGHT	M/C	M/C	M/C		M/C	M/C
	7684	B.J. BODENSTEIN	MTG	MTG	MTG		MTG	MTG
DESPATCH	146	J.L. VAN NIEKERK						AWP
CRANES	502	P.J. VAN DER WALT	M/C	M/C	M/C	M/C	M/C	M/C
	1251	D.E. FLEMMING					AWP	A
	1276	J.T. DU PREEZ			AWP	AWP		
	1304	P.J. MARITZ			A	A		
	1311	D.P. YZEL	M/C	M/C	M/C	M/C	M/C	M/C
	1325	H. GOOSEN	M/C	M/C	M/C	M/C	M/C	M/C
	1327	A.H. HERBST					A	
	1339	W.H. BEYLEVELDT	M/C	M/C	M/C	M/C	M/C	M/C
	1351	G.A. SCHOEMAN	M/C	M/C	M/C	M/C	M/C	
	1353	N.J.R. COETZEE					IOD	
	1364	G.R. LUBBE				A		
	1370	D.J. VISSER			A	A		
	1373	P.J.M. ERASMUS			A	A	A	A
	1374	M.T. VAN DER MESCHT		A	A	A	A	A
	1376	G.C. SMIDT			IOD	IOD	IOD	IOD
	1922	A.G. VAN NIEKERK	MTG	MTG	MTG	MTG	MTG	MTG
	1994	C.J. BARNARD		A				A
	6607	G.J. OLIVIER						A
	1346	P.H. LANDMAN						A
	1361	A.R. VAN ROOYEN						A
ENGINEERING	197	G.A. MITCHELL	M/C	M/C	M/C			
	2294	D. BARNARD	AWP					
	2337	A. OBERHOLZER	A	A	A		A	A
	2357	T.J. DAVY	M/C	M/C	M/C		M/C	M/C
	2819	L.A.J. PRINS	M/C	M/C	M/C		M/C	M/C
	2886	J.L. GEYER	MTG	MTG	MTG		MTG	MTG
	2888	J.T. PUTTER	MTG	MTG	MTG		MTG	MTG
	2921	D.M. CAMPBELL	IOD	IOD	IOD		IOD	IOD
	2933	W.J.C. NELL			AWP		AWP	AWP
	2934	J.A. THOM		AWP				
	2935	D.A. MAVIGLIA	A	A	A		A	
	2936	B.G. EVANS		A				
	3014	J.H. NELL	A					
	3505	T.P. BOTHA	AWP					
	3833	A.J.A. OTTEN					A	
	4517	H.J.P. OLIVIER					A	A
	4557	C.W.S. VAN DER BERG					M/C	M/C
	6788	G.A. HAASBROEK	IOD	IOD	IOD		IOD	IOD
	6790	G.A. WOLMERANS	IOD	IOD	IOD		IOD	IOD
	5774	G.E. HOLLAND	A	A	A		A	
	5779	L.W. GOUWS	A	A	A		A	

Department	Co. No.	Name	Wed	Thu	Fri	Sat	Mon	Tue
MELTING	581	D.J.G. DE KLERK	A					
	602	C.H. PETZER	M/C	M/C	M/C	M/C	M/C	M/C
	626	P.W. NEL				AWP		
	6407	T.E. DIPPENAR				AWP		
	6453	J.C. THOMPSON	A	A	A	A		
	6524	C.H. BEUKES	M/C	M/C				
	6555	P.S. SNOWDEN	IOD	IOD	IOD	IOD	IOD	IOD
	6584	A.P.J. VAN WYNGAARDT	M/C	M/C	M/C	M/C		
	6610	J. EICHORN	M/C	M/C	M/C	M/C		
	6654	G. PRETORIUS			A	A		
	6655	C.A. STEFFENS					A	
	6656	H.P. PELSER	A	A	A	A	A	
	6657	L. VECKERMAN	A	A	A	A	A	
	6662	P.J.M. TAYLOR					A	A
	6669	C.J.J. ROWE					A	
	6666	A.J. SWART				A		
LABORATORY	1026	J.F. VAN DER WESTHUIZEN	M/C	M/C				
	1794	J.L. KLOPPER					A	
	7315	B.J. BAM	A					
	7367	M.J. POTGIETER	A	A	A		A	
			41	40	43	24	43	33

SUMMARY OF JOURNAL VOUCHER ENTRIES

DATE: _____

1. Deductions: European Wages
2. Bantu Wages
3. Salaries
4. Salaries Month end Adjustments
5. Leave Pay and Paid Holidays Paid
6. Salaries and Wages + Monthly Provisions - Leave Pay & Paid Holidays (Statutory)
7. Auxiliary Wages including Idle and Waiting Time
8. Statutory Deductions - Bantu
9. - European
10. Metal and Engineering Ind's Education/Training Fund
11. Overtime Premium
12. Raw Material Usage
13. - Stock Adjustments
- 14/1 Ingots, Billets & Bars used on works
- 14/2 Provisional Charges - Castings used in Works
- 14/3 Reversal - Provisional Charges - Castings used in Works
15. Residual Credits
16. Electricity & Heating Current for Furnaces
17. Creosote used on Works
18. Gas Consumption
19. Moulds and Appliances
- 20/1 Rolls Tariff
- 20/2 Tariff for Straightening Rolls
21. Box Parts - Tariff
22. Maintenance - Tariff
23. Furnace Lining - Tariff
24. Trial Runs 18/22" Mill and Sundry Provisions
25. Depreciation
26. - Direct Operations Apportionment
27. Works Insurance etc.
28. Monthly Write off - prepaid expenses: General
29. Outside Machining - Castings
30. Company Contributions - Various
31. Workmen's Compensation Insurance
32. Staff Training
33. Employees Welfare

34. Sales Services - Advertising
35. - Cartage on Sales - Steel Sections
- 36/1 - Commission on Sales
- 36/2 Adjustment of estimated Commission on Sales - Previous Month
37. Sales
38. Discount Allowed
39. Sundry Debtors Journal
40. Administration Services - Bad Debts
41. - Iscor Co-ordinating Council
42. - Etc.
43. Monthly write-off - Prepaid Expenses
44. Sundry Collection Fees.
45. Debenture Trustees Remuneration
46. Miscellaneous Profit and Loss Account - Interest
47. Interest Receivable on Loans
48. Miscellaneous Profit and Loss
49. - Commissioning Costs etc.
50. Stock Adjustments - Monthly Write-off
51. Stock in Transit
52. Trade Creditors
53. Renewal of U.A.L. Bills
54. Autobale Subsidy
55. South African Railways Charges
56. Works Railway Costs
57. Sundry Debtors
58. Account of Expenditure - Employees
59. Administrative Services
60. - do -
61. - do -
62. Sales
63. Provision for Scrapped Production, Stock Shortages, etc. Manufactured Products
64. Ingots Scrapped ex Stock
65. Billets Scrapped ex Stock
66. Sections and Bars Scrapped ex Stock
67. Residual Credits
68. Thomas Mouget International (Pty.) Ltd.,
69. - do -
70. Trade Debtors
71. - do -
72. Direct White Labour - Works Overheads

- 73. Direct White Labour - Services and Auxiliary Departments
- 74. - Auxiliary Wages/Idle and Waiting Time
- 75. - Miscellaneous
- 76. Direct Bantu Labour - Works Overheads
- 77. - Services and Auxiliary Departments
- 78. - Miscellaneous
- 79. Salaries - Charged to Works Overheads
- 80. - Service and Auxiliary Departments
- 81. - Miscellaneous
- 82. Consumable Stores Issues.
- 83. Clearances - Operating Materials
- 84. - Maintenance Materials
- 85. Transport charges to: Service and Auxiliary Departments (Estimates)
- 86. - (Non Estimates)
- 87. : Works Overheads
- 88. : Miscellaneous
- 89. Workshop Charges to : Service and Auxiliary Departments - (Estimates)
- 90. - (Non Estimates)
- 91. : Works Overheads
- 92. : Miscellaneous
- 93. Electricity - Service and Auxiliary Departments
- 94. - Charges to Works Overheads
- 95. - Miscellaneous Charges
- 96. Heating Current for Electric Furnaces
- 97. Water/Reticulation Charges to - Service and Auxiliary Departments
- 98. - Works Overheads
- 99. Compressed Air Charges to Service and Auxiliary Departments
- 100. Oxygen Charges to Service and Auxiliary Departments
- 101. Leave Pay - European - Works Overheads
- 102. - Service and Auxiliary Departments
- 103. - Auxiliary Wages/Idle and Waiting Time
- 104. - Miscellaneous
- 105. - Bantu - Works Overheads
- 106. - Service and Auxiliary Departments
- 107. - Miscellaneous
- 108. Laboratory Salaries Charged Out
- 109/1 Furnace Lining Projects
- 109/2 Furnace Linings

- 109/3 Furnace Linings
- 110/1 Extra-ordinary Maintenance Projects
- 110/2 Extra-ordinary Maintenance
- 111. Transfer of Scrap - Thos. Mouget
- 112. Clearance - Operating Material ex Thomas Mouget
- 113/1 Petty Cash Disbursements - Works Overheads
- 113/2 - Service and Auxiliary Departments
- 113/3 - Miscellaneous
- 114. Reversal of Previous Months Estimates re Extra-ordinary Creditors
- 115. Extra-ordinary Creditors - Actual Charges
- 116. Estimates Re Extra-ordinary Creditors Accounts not to hand
- 117. Trade Creditors - Reversal of Previous Month's Estimates
- 118. - Previous Months Actual
- 119. Sale - Residual Material not scrapped
- 120. Sundry - Stores Issues - Correction of Allocation
- 121. Mobile Equipment Charges to Service and Auxiliary Departments
- 122. Compound Licence
- 123. Provision for Meltshop Incentive Bonus
- 124. Monthly Charges - Service Rendered
- 125. Printing Services (Own) Expenses - Apportionment of Costs to Users
- 126. D.I.S.W. Inter-Co. Debit Notes to S.B.I.S.
- 127. Credit Notes
- 128. S.B.I.S. - Selling and Distribution Expenses
- 129. - Railage and Cartage Costs Re Castings Manufactured in Area 9
- 130. - Costs of Castings Production in Area 9
- 131. S.B.I.S. Inter-Co. Debit Notes to D.I.S.W.
- 132. Credit Notes
- 133. Adjustments Regarding Pension Scheme Contributions in Respect of:-
 - a. S.B.I.S. Scheme members on D.I.S.W. Payrolls and
 - b. D.I.S.W. S.B.I.S.
- 134. Clearance of excess of machining charges to S.B.I.S.
- 135. Provision for Quarterly Credit Note - Robor Ltd.,
- 136. S.B.I.S. Telex Charges
- 137. Stock Transfers - Sections/Bars from Stock to 2nd Grade material
- 138. A.T.H. Consulting Fee
- 139. Company House Charges
- 140. Monthly Standing Charges (1, 2 and 3)
- 141. Monthly Charge for Printing and Stationery

MONTH: _____

DATE: _____

RAW MATERIAL USAGE

A/C NO.	DESCRIPTION	AMOUNT	
		Debit	Credit
320/901	Basic Pig Iron Issues to Melt Shop.	.....	.....
320/902	Cast Iron Scrap Issues to Melt Shop	.....	.....
320/903	Steel Scrap Issues to Melt Shop	.....	.....
320/905	Iron Ore Issues to Melt Shop	.....	.....
320/906	Manganese Ore Issues to Melt Shop	.....	.....
570/908	Iron Ore Issues to Sponge Iron Plant	.....	.....
100/131	To: Basic Pig Iron for Melt Shop	.....	.....
100/132	Iron Ore Stock for Melt Shop	.....	.....
100/133	Manganese Ore Stock for Melt Shop	.....	.....
100/134	Cast Iron Scrap Stock for Melt Shop	.....	.....
100/135	Steel Scrap Stock for Melt Shop	.....	.....
100/136	Iron Ore Stock for Sponge Iron Plant	.....	.....
100/245	Provision for: Pig Iron Fluctuation	.....	.....
100/297	Steel Scrap Fluctuation	.....	.....
100/298	Cast Iron Scrap Fluctuation	.....	.....

Being charges for Raw Material Usage for the month per Melt Sheet Summary in
Tonnes Book and Sponge Iron Plant Record.

A. MELT SHOP	TONS	DEBIT STOCK			CREDIT STOCK			CREDIT PROVISION		
		A/c	Rate	Amount	A/c	Rate	Amount	A/c	Rate	Amount
Pig Iron		901			131			245		
Cast Iron Scrap		902			134			298		
Steel Scrap:										
Skull										
Ingots										
Other										
Total:		903			135			297		
Iron Ore		905			132					
Manganese Ore		906			133					
B: S.I. PLANT										
Iron Ore Usage		908			136					
		909			136					

VOUCHER COMPILED BY: _____

MONTH: _____

JOURNAL ENTRY VOUCHER NO.: 12

DEVIATION OF ACTUAL GROSS PROFIT FROM ESTIMATED GROSS PROFIT FOR

JUNE. 19 73

Rand

A. COMPARISON

Gross Profit per Estimate
dated 5th July, 1973

407 149

MAY, 19 73

378 204

Actual Gross Profit per Cost
Statement dated 6th July, 1973

411 668

394 232

FAVOURABLE VARIANCE per '8'

4 519

16 028

B. CONSTITUTION OF FAVOURABLE VARIANCE

(a) STOCK

1. Ingots
2. Billets
3. Section & Bar - 18/22"
4. T.M.B. - 18/22"
5. Section & Bar - Med. 12"
- Light 12"
6. Second Grade
7. Castings
- 8.
- 9.
- 10.

TONNAGE		VALUE	
@		Estimate	Actual
51,79	1 681	87 280	87 063
65,37	728	47 260	47 591
88,45	1 394	120 380	123 295
86,31	1 202	101 980	103 744
87,82	723	63 770	63 494
44,00	3	130	132
		420 800	425 319
			420 800
			4 519

(b) ROLLED OFF

FAVOURABLE VARIANCE as per 'A'

4 519

JUNE, 19 73

MonthYear to Date

Turnover	R 2 223 579	R11 380 928
Gross Profit	R 411 668	R 1 783 830
Gross Profit %	18,5	15,7
Net Profit Before Tax	R 251 086	R 892 745
Net Profit Before Tax %	11,3%	7,8%
Finished Sections - Produced	M.T. 16 586	M.T. 102 106
- Sold	M.T. 17 706	M.T. 100 520
Liquid Steel Produced	M.T. 27 083	M.T. 156 902
Ingots Produced	M.T. 19 251	M.T. 107 058
Billets Produced	M.T. 23 790	M.T. 137 435

- Included in Billet Production is Continuous Casting Plant Production of:

R 6 756

R 44 016

ESTIMATED GROSS PROFIT - BEFORE COMPILATION OF COST STATEMENTS - BASED ON BALANCESHEET MOVEMENTS AND ESTIMATED COSTS PER TON OF CLOSING WORK IN PROGRESS AND FINISHED GOODS

		JUNE, 1973	19	Tons	MAY, 1973
I. ESTIMATED NET PROFIT:					
Excess of Assets over Liabilities for month of June, 1973			393 332		314 976
Less - XXX : Estimated Decrease in Stock of Finished Goods and Work in Progress per Schedule II below			146 765		98 886
<u>APPARENT NET PROFIT</u>			246 567		216 090
Add: Back charges included in new system as Production Costs formerly treated as charges against Profit, viz:-					
1. Depreciation	119 764				120 690
2. Advertising re Dividends	60				60
3. Audit Fees	1 000				1 000
4. Directors Fees	1 168				1 167
5. Management Consultants Fees	-				-
6. Secretarial Fees	500				500
			112 492		123 417
Add: Back Profit and Loss Account Net - Per Schedule II			369 059		339 507
			38 090		38 697
<u>APPARENT COMPARABLE GROSS PROFIT:</u>			R 407 149		378 204

II. STOCK MOVEMENTS FOR MONTH OF JUNE, 1973 - BASED ON MAY, 1973 STOCK VALUATION

	@	ACTUAL		ESTIMATED	
		LAST MONTH		THIS MONTH	
		Tons	Value	Tons	Value
Ingots	51,92	2 054	106 644	1 681	87 280
Billets	64,92	714	46 350	728	47 260
Sections, Bar - 18/22"	86,38	2 299	198 549	1 394	120 380
T.M.B. - 18/22"	88,70	38	3 371		
Sections, Bar - Medium	84,84	1 652	140 151	1 202	101 960
- Light	88,20	809	71 356	723	63 770
2nd Grade Material	44,00	26	1 144	3	130
			567 565		420 800
					567 565
					146 765

III. QUANTITATIVE COMPARISON

	Last Month	This Month	Mutation
i. Ingots	2 054	1 681	- 373
ii. Billets	714	728	+ 14
iii. Section and Bar	4 824	3 322	- 1 502
	7 592	5 731	- 1 861

DUNSWART IRON AND STEEL WORKS, LIMITEDIII. PROFIT AND LOSS ACCOUNT DEBITS AND CREDITS, i.e. NET

		<u>JUNE, 1973</u>			
				<u>Last Month</u>	<u>This Month</u>
1.	301	Discounts Received	Cr.	3 224	Cr. 3 929
2.	302	Discounts Allowed			
3.	303	Dividends - Ordinary			
4.	304	Dividends - Preference			
5.	305	Debenture Interest		4 667	4 667
6.	306	Interest - Overdraft		325	2 305
7.	307	Interest - Loans		18 240	16 826
8.	308	Interest - Receivable	Cr.		Cr.
9.	309	Sundry Revenue	Cr.	2 814	Cr. 3 329
10.	310	Miscellaneous Expenses		2 242	2 474
11.	311	Income Tax			
12.	312	Commissioning Costs			
13.	313	Donations		16	
14.	314	Interest - Other			
15.	315	P & L on Disposal of Fixed Assets			Cr. 208
16.	316	Bad Debts Recovered			
17.	319	Interest - Swiss Franc Notes		19 250	19 250
18.	320	- Imported Machinery			
19.	321	Debenture Trustees		35	35
20.	322	Dividend Received	Cr.	40	Cr. 1
				<u>R38 697</u>	<u>R 38 090</u>
890		Depreciation		120 690	119 764
		Less: Depreciation S.I.P. included			
		in charge to deferred revenue expenditure		40 597	40 603
				<u>R80 093</u>	<u>R79 161</u>

REGISTERED OFFICE

FRENCH HOUSE, 54 MARSHALL STREET, JOHANNESBURG

TELEGRAPHIC ADDRESS
"ELMWOOD"

TELEPHONES 838-4081/9
P.O. BOX 9123

ADVANCE REPORT

For the year ending 30th June, 1968

ACCOUNTS

Preliminary figures, subject to audit, for the financial year ended 30th June, 1968 are set out hereunder and are compared with those of the previous year.

	<u>Estimated 1968</u>	<u>Actual 1967</u>
Gross Trading Profit	R2,750,000	R2,735,402
Depreciation	785,000	839,278
Profit Before Tax	1,800,000	1,540,954
Taxation	693,000	549,594
Dividends	412,000	412,000

STANDARD BRASS AGREEMENT

As announced in the Press on 15th May, 1968, agreement has been reached with the Standard Brass, Iron and Steel Foundries, Limited, in terms of which that Company has acquired the foundry interests of your Company, against the issue to your Company of 828,201 ordinary shares of 50 cents each (representing a 30% interest) in the Standard Brass Iron and Steel Foundries Limited, and in addition against a cash payment by your Company of R1,100,000 to be employed in merging the two Companies' foundry operations in the premises of Standard Brass and in effecting additional capital investment in new facilities.

This agreement has now been ratified by the shareholders of the Standard Brass, Iron and Steel Foundries, Limited. Dr. F. A. Zoellner and Mr. K. C. Whyte, directors of your Company, have joined the Board of the Standard Brass Iron and Steel Foundries Ltd.

BY ORDER OF THE BOARD

ENGELHARD HANOVIA OF SOUTHERN AFRICA
(PROPRIETARY) LIMITED

Secretaries

per: R. K. Cowley

31st July, 1968.

DIRECTORS: DR. F. A. ZOELLNER (GERMAN) (CHAIRMAN),
C. L. CARTWRIGHT, K. SCHERMER (AUSTRIAN), (JOINT MANAGING DIRECTORS),
W. GRAINGER (BRITISH), G. M. PAETGEN (GERMAN), M. E. RICH (BRITISH), D. M. SAAGER (SWISS), K. C. WHYTE D.S.O., D.F.C.
ALTERNATE DIRECTORS: O. R. NOTHARD, E. A. THURMAN (BRITISH).

DUNSWART IRON & STEEL WORKS, LIMITED

REGISTERED OFFICE

FRENCH HOUSE, 54 MARSHALL STREET, JOHANNESBURG

TELEGRAMS
"ELMWOOD"TELEPHONES 838-4081/9
P.O. BOX 9123**ADVANCE REPORT**

For the year ending 30th June, 1967

ACCOUNTS

Preliminary figures, subject to audit, for the financial year ended 30th June, 1967 are set out hereunder and are compared with those of the previous year.

						Estimated 1967	Actual 1966
Gross Trading Profit	....	....	....	....		R2,600,000	R1,804,209
Depreciation	....	....	....	....		840,000	746,785
Profit Before Tax	....	....	....	....		1,500,000	709,262
Taxation	....	....	....	....		532,000	63,006
Dividends	....	....	....	....		412,000	412,000

GENERAL

During the year the overdraft, loans and long term liabilities have been reduced by R2,100,000. Since the end of the financial year a further R200,000 has been repaid.

Stocks and stores have been substantially reduced and the Company enters the new year in a strong financial position and with a healthy order book.

BY ORDER OF THE BOARD

ENGELHARD HANOVIA OF SOUTHERN AFRICA
(PROPRIETARY) LIMITED

Secretaries

per: R. K. Cowley

5th July, 1967.

DIRECTORS: DR. F. A. ZOELLNER (GERMAN) (CHAIRMAN),

C. L. CARTWRIGHT, W. GRAINGER (BRITISH), G. M. PAEFGEN (GERMAN), D. M. SAACER, (SWISS), K. SCHERMER (AUSTRIAN), M. E. RICH (BRITISH), K. C. WHYTE, D.S.O., D.F.C.

ALTERNATE DIRECTORS: Q. R. NCTHARD, F. A. THURMAN, (BRITISH).

DUNSWART, IRON AND STEEL WORKS, LIMITED

PLAN OF ACCOUNTS

AND

COST CENTRE CODES

SUPERSEDES AND REPLACES ACCOUNTING AND COST FINDING MANUAL IN FORCE FROM 1.6.1965, AS AMENDED

C.A. 13.9.1974

DUNSWART IRON AND STEEL WORKS, LIMITEDCOST CENTRE CODE

100	GENERAL	
300	MELT SHOP	
310	SCRAP YARD	
320	FURNACES	
330	LADLE MAINTENANCE	
340	CASTING BAY	
400	ROLLING MILLS	
410	30" COGGING MILL	
411		SOAKING PIT
412		ROLLING
413		ELPIT
420	22"/18" HEAVY MILL	
421		RE-HEATING FURNACE (NO. 2)
422		NO. 1 & 2 ROLLING TRAIN
423		NO. 3 & 4 ROLLING TRAIN
424		COOLING BED
430	18" HEAVY MILL	
431		RE-HEATING FURNACE
432		ROLLING
		) THIS MILL DEMOLISHED. THESE CODES NOT TO BE USED.
440	12" MEDIUM MILL	
441		RE-HEATING FURNACE (NO. 4)
442		ROLLING
443		COOLING BED
450	18"/12"/11" LIGHT MILL - SIEMAG	
451		RE-HEATING FURNACE (NO. 3A)
452		ROUGHING TRAIN
454		FINISHING TRAIN
455		COILING
456		COOLING BED

COST CENTRE CODE (CONT.)

460

MILLS DESPATCH

461

RE-CUTTING AND
RE-CLAMATION

550

CONTINUOUS CASTING PLANT

570

SPONGE IRON PLANT

ACCOUNTS CODE

900	MATERIALS USAGE
800	OPERATING COSTS INCLUDING WORKS SERVICES
700	CAPITAL AND MAINTENANCE PROJECTS - WORK IN PROGRESS
600	WELFARE SERVICES
500	SELLING AND DISTRIBUTION EXPENSES
550	SALES - MANUFACTURED AND OTHER PRODUCTS
400	ADMINISTRATIVE SERVICE
300	MISCELLANEOUS PROFIT AND LOSS
200	BALANCE SHEET - LIABILITIES
100	BALANCE SHEET - ASSETS

DUNSWART IRON AND STEEL WORKS, LIMITEDBALANCE SHEET - ASSETS

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
	<u>FIXED ASSETS</u>
101	PROPERTY
102	BUILDINGS
103	RAILWAY SIDING
104	GANTRIES
105	PLANT AND MACHINERY
106	FURNACES
107	PATTERNS
108	BOX PARTS
109	
110	
111	OFFICE EQUIPMENT
112	OFFICE FURNITURE
113	
114	MOTOR VEHICLES
115	CAPITAL WORK IN PROGRESS DEPOSITS
700	CAPITAL WORK IN PROGRESS
776	DEFERRED REVENUE EXPENDITURE - EXTRAORDINARY MAINTENANCE
777	- FURNACE LININGS
	<u>OTHER ASSETS</u>
130	GENERAL MINING AND FINANCE CORPORATION LIMITED
116	SHARES IN SUBSIDIARIES - DUNSWART PROPERTIES (PTY.) LTD.
117	- MINERAL EXPLORATION COMPANY OF S.A. (PTY.) LTD.
118	- ELMWOOD HOLDINGS (PTY.) LTD.
129	- DICKOR HOLDINGS (PROPRIETARY), LIMITED

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
119	ADVANCES TO SUBSIDIARIES - DUNSWART PROPERTIES (PTY.) LTD.
120	- ELMWOOD HOLDINGS (PTY.) LTD.
121	- THE STANDARD BRASS, IRON & STEEL FOUNDRIES, LTD.
137	- MINERAL EXPLORATION OF S.A. (PTY.) LTD.
142	- DICKOR HOLDINGS (PTY.) LTD.
138	ADVANCES TO ASSOCIATED COMPANIES
122	PRE-ACQUISITION ADVANCES SUBSIDIARIES - MINERAL EXPLORATION CO. OF S.A. (PTY.) LTD.
123	SHARES IN ASSOCIATED COMPANIES
124	TRADE INVESTMENTS
125	QUOTED INVESTMENTS
126	UNQUOTED INVESTMENTS
127	SCRAP QUOTA DEPOSIT
128	TAXATION LOAN LEVY
129	(SEE OTHER ASSETS - AFTER A/C 118)
130	(SEE OTHER ASSETS - BEFORE A/C 116)
	<u>CURRENT ASSETS</u>
131	BASIC PIG IRON
132	IRON ORE (M.S.)
133	MANGANESE ORE
134	SCRAP - CAST IRON
135	- STEEL
148	- STEEL - AT NOMINAL VALUE
136	- IRON ORE - S.I.P.
137	(SEE OTHER ASSETS - AFTER A/C 121)
138	(SEE OTHER ASSETS - AFTER A/C 121)
139	CLAIMS AGAINST - DICKOR HOLDINGS (PROPRIETARY) LIMITED
140	- ELMWOOD HOLDINGS (PROPRIETARY) LIMITED
141	SCRAP RECOVERED: THOMAS MOUGET
142	(SEE OTHER ASSETS - AFTER A/C 137)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
143	SPONGE IRON - OWN MANUFACTURE
144	STEEL INGOTS - OWN MANUFACTURE
145	STEEL BILLETS - OWN MANUFACTURE
146	STEEL BILLETS - PURCHASED
147	FINISHED BARS - OWN MANUFACTURE
148	(SEE CURRENT ASSETS - AFTER A/C 135)
149	
150	
151	
152	OUTSIDE MACHINED WORK
153	
154	
155	
156	STORES CONSUMABLE
157	STORES ADJUSTMENT ACCOUNT
158	STORES-IN-TRANSIT
159	
160	COMPOUND BOOTS AND CLOTHING
161	
162	
163	STOCK ADJUSTMENTS
164	STOCK ADJUSTMENTS - ABNORMAL
165	
166	TRADE DEBTORS CONTROL
167	OTHER DEBTORS CONTROL
168	DEBTORS ADJUSTMENT ACCOUNT
169	INSURANCE CLAIMS

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
170	
171	
172	
173	
174	
175	PAYMENTS IN ADVANCE - GENERAL
176	- INSURANCES
177	- INTEREST
178	
179	
180	
181	DEPOSITS - CUSTOMS DUTY
182	- GENERAL
183	
184	GAS PRODUCER PLANT
185	
186	LOANS ON CALL
187	
188	CASH AT BANK
189	
190	CASH IN TRANSIT
191	PETTY CASH - BENONI
192	
193	
194	PETTY CASH - JOHANNESBURG OFFICE
195	- COMPOUND
196	
197	
198	
199	

DUNSWART IRON AND STEEL WORKS, LIMITEDBALANCE SHEET - LIABILITIES

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
	<u>SHAREHOLDERS EQUITY</u>
201	SHARE CAPITAL - ORDINARY
202	- CUMULATIVE PREFERENCE
203	
204	
205	SHARE PREMIUM ACCOUNT
206	PROPERTY REVALUATION RESERVE
207	
208	
209	TAXATION EQUALISATION RESERVE
210	
211	DEBENTURE REDEMPTION RESERVE
212	GENERAL RESERVE
213	PENSION FUND RESERVE
214	APPROPRIATION ACCOUNT
215	
	<u>LONG TERM LIABILITIES</u>
216	MORTGAGE DEBENTURE STOCK
217	LONG TERM LOAN
218	
219	
220	
	<u>CURRENT LIABILITIES</u>
221	TRADE CREDITORS CONTROL
222	OTHER CREDITORS CONTROL

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
223	EXTRAORDINARY CREDITORS CONTROL
224	CREDITORS ADJUSTMENT ACCOUNT
225	EUROPEAN EMPLOYEES
226	BANTU EMPLOYEES
227	EUROPEAN WAGE CREDITORS
228	BANTU WAGE CREDITORS
229	EUROPEAN SALARIES CREDITORS
230	
231	ACCRUALS
232	
233	BILLS PAYABLE - OVERSEAS
234	- LOCAL
235	SHAREHOLDERS FOR DIVIDEND - ORDINARY
236	- PREFERENCE
237	
238	
239	LOANS ON CALL
240	
241	
242	
243	OVERDRAFT
244	
	<u>PROVISION FOR:</u>
245	PIG IRON PRICE FLUCTUATION
246	ADVERTISING - DIVIDENDS
247	
248	APPRENTICE SCHOOL FEES

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
249	AUDIT FEES
250	INVESTMENT DETERIORATION
251	
252	BAD DEBTS
253	BONUS
254	EXPORT EXPENSES - TRANSFER TO ACCOUNT 508 AT FINANCIAL PERIOD ENDS
255	CONTINGENCIES
256	CURRENCY VARIANCES
257	DEPRECIATION - GANTRIES
258	- PLANT AND MACHINERY
259	- FURNACES
260	- BOX PARTS
261	- BUILDINGS
262	- OFFICE EQUIPMENT
263	- OFFICE FURNITURE
264	
265	- MOTOR VEHICLES
266	CASTINGS SCRAPPED PRODUCTION, STOCK SHORTAGES ETC.
267	DEBENTURE TRUSTEES REMUNERATION
268	DIRECTORS FEES
269	DISCOUNT ALLOWED
270	DISCOUNT RECEIVED
271	FURNACE LININGS
272	ISCOR CO-ORDINATING COUNCIL
273	S.I.P. TERTIARY PIPES
274	LEAVE PAY - EUROPEAN
275	- BANTU

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
276	MAINTENANCE - GENERAL
277	- CONTINUOUS CASTING PLANT
278	- MILLS
279	MOULDS/SLAG BOWLS/SLAG LADLES
280	OVERSEAS TRAVELLING
281	PAID HOLIDAYS - EUROPEAN AND BANTU
282	STRAIGHTENING ROLLS
283	PRE-ACQUISITION LOSSES SUBSIDIARIES - MINERAL EXPLORATION CO. OF S.A. (PTY.) LTD
284	MAINTENANCE - SPONGE IRON PLANT
285	SHAREHOLDERS EXPENSES
286	ROLLS AND TACKLE
287	SALES AIDS AND ADVERTISING
288	STAFF TRAINING
289	STAFF WELFARE
290	TAXATION
291	ELIMINATION OF OVERHEADS - WORK IN PROGRESS - FINISHED PRODUCTS
292	ELIMINATION OF ESTIMATED OVERSTATED COSTS - WORK IN PROGRESS - FINISHED PRODUCTS
293	MAINTENANCE OVERHEAD CRANES
294	MAINTENANCE GAS PRODUCER PLANT
295	DEFECTIVE MATERIAL RETURNS
296	SCRAPPED PRODUCTION STOCK SHORTAGES ETC. OWN MANUFACTURED PRODUCTS
297	STEEL SCRAP FLUCTUATION
298	CAST IRON SCRAP FLUCTUATION
299	OBSOLESCENCE

MISCELLANEOUS PROFIT AND LOSS - MONTHLY ACCOUNTS

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
301	DISCOUNTS RECEIVED
302	DISCOUNTS ALLOWED
303	
304	
305	DEBENTURE INTEREST
306	INTEREST ON OVERDRAFT AND COMMITMENT FEES
307	INTEREST PAYABLE ON LOANS
308	INTEREST RECEIVABLE ON LOANS
309	SUNDRY REVENUE
310	MISCELLANEOUS EXPENSES
311	
312	COMMISSIONING COSTS
313	DONATIONS
314	INTEREST - OTHER
315	PROFIT AND LOSS - DISPOSAL OF ASSETS
316	BAD DEBTS RECOVERED
317	PROFIT AND LOSS - SHARE TRANSACTIONS
318	
319	INTEREST - SWISS FRANK NOTES
320	- IMPORTED MACHINERY
321	DEBENTURE TRUSTEES REMUNERATION
322	DIVIDENDS RECEIVED
323	NON RECURRING REVENUE

MISCELLANEOUS PROFIT AND LOSS - ANNUAL ACCOUNTS

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
350	MANUFACTURING ACCOUNT
351	TRADING ACCOUNT
352	PROFIT AND LOSS ACCOUNT

MISCELLANEOUS PROFIT AND LOSS - TRANSFERS

359	TRANSFERS OUT
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ADMINISTRATION SERVICES

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
401	SECRETARIAL - SALARIES AND WAGES
402	- POSTAGE, TELEPHONES, CABLES, TELEX
403	- PRINTING AND STATIONERY
404	- LEGAL EXPENSES
405	- GENERAL INSURANCE
406	- BAD DEBTS
407	- STAFF REFRESHMENTS
408	- PUBLICATIONS
409	- SUBSCRIPTIONS
410	- ISCOR CO-ORDINATING COUNCIL
411	- GENERAL EXPENSES
421	ACCOUNTS - SALARIES AND WAGES
422	- OFFICE EQUIPMENT RENTAL
423	- OFFICE EQUIPMENT MAINTENANCE
424	- TIME OFFICE EXPENSES
425	- BANK CHARGES
426	- AUDIT FEES
427	- CONSULTANTS FEES
428	- DEPRECIATION - OFFICE EQUIPMENT
431	- GENERAL EXPENSES
432	- COMPUTER EXPENSES
433	- PRINTING EXPENSES - OWN OPERATIONS
434	- ACCOUNTING MACHINE CENTRE EXPENSES
441	GENERAL - CAR EXPENSES
442	- OFFICE MAINTENANCE
443	- MANAGEMENT REMUNERATION

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
444	GENERAL - DIRECTORS' FEES
445	- COMPANY HOUSES
446	- ENTERTAINMENT
447	- OVERSEAS TRAVELLING
448	
449	- JOHANNESBURG OFFICE
450	- DEPRECIATION - OFFICE FURNITURE
451	- MISCELLANEOUS

SELLING AND DISTRIBUTION EXPENSES

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
501	ADVERTISING	ALL CHARGES FOR ADVERTISING INCLUDING ANY TRANSFERS TO SALES AID PROVISION
502	CARTAGE ON SALES - STEEL	ALL CARTAGE CHARGES INCURRED ON SHIPMENTS, AGAINST WHICH IS CREDITED CARTAGE CHARGES INVOICED TO CUSTOMERS
503	- CASTINGS	
504	COMMISSION ON SALES - STEEL	ALL COMMISSION PAYABLE TO COMPANY AGENTS
505	- CASTINGS	
506	SALES SALARIES	ALL SALARIES ATTRIBUTABLE TO SALES STAFF
507	SALES EXPENSES	ALL TRAVELLING EXPENSES, CAR EXPENSES AND GENERAL EXPENSES OF DEPARTMENT
508	EXPORT EXPENSES	SALES EXPENSES INCURRED IN EXPORTS (EXCLUDING FREIGHT), SUCH AS INSURANCE

SALES - MANUFACTURED AND OTHER PRODUCTS

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
551	SALES - 2ND GRADE FINISHED PRODUCTS
552	- BILLETS - ROLLED PRODUCTS
553	- CONTINUOUS CASTING PLANT PRODUCTS
554	- STEEL BARS ORD. - 12" MEDIUM MILL
555	- STEEL BARS ORD. - 18"/12"/11" LIGHT MILL - SIEMAG
556	
557	
558	- STEEL BARS ORD. - 22"/18" MILL
559	- STEEL BARS - TMB & GB - 22"/18" MILL
560	- STEEL BARS ORD. - 30" COGGING MILL
561	- RE-ROLLING CUSTOMERS OWN PRODUCTS
562	- STEEL INGOTS
571	
572	
573	

WELFARE SERVICES

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
601	COMPANY CONTRIBUTIONS - PENSIONS	
602	- PROVIDENT FUNDS	
603	- MEDICAL AID	
604	- U.I.F.	
605	WORKMEN'S COMPENSATION INSURANCE	
621	PERSONNEL OFFICE EXPENSES	
631	STAFF TRAINING	
632	COFFEE MACHINES	
633	EMPLOYEES' WELFARE	
634	MEDICAL SERVICES	
641	COMPOUND - SALARIES AND WAGES	
642	- SOUP KITCHEN AND BEER	
651	- GENERAL	

REFER BALANCE SHEET - FIXED ASSETS

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>
700	CAPITAL WORK IN PROGRESS
776	DEFERRED REVENUE EXPENDITURE - EXTRAORDINARY MAINTENANCE
777	DEFERRED REVENUE EXPENDITURE - FURNACE LININGS

OPERATING COSTS

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
801	DIRECT LABOUR - EUROPEAN	ALL BASIC WAGES, BONUS AND SHIFT PREMIUM COSTS ATTRIBUTABLE TO DIRECT LABOUR WHILST ENGAGED ON PRODUCTIVE OPERATIONS. ALL WAGES ACCRUED COVERING PART OF MONTH NOT INCLUDED IN WAGES WEEK. DIRECT WAGES WILL BE CREDITED WITH WAGES EARNED DURING IDLE AND WAITING TIME. THE DEBIT TO THIS ACCOUNT FOR WAGES PAID WILL BE TAKEN FROM MONTHLY COMPUTER PRINT OUT.
802	- BANTU	
803	IDLE AND WAITING TIME	THE DIRECT LABOUR COST INCURRED WHILST THE LINE IS NOT WORKING. THIS IS CALCULATED BY THE ACCOUNTANT FROM THE HOURS FOR IDLE AND WAITING TIME DECLARED BY THE STATISTICS SHEET IN PROPORTION TO TOTAL HOURS AND TOTAL DIRECT LABOUR.
804	OVERTIME PREMIUM	THE DIFFERENCE BETWEEN EMPLOYING DIRECT LABOUR AT OVERTIME RATES AND BASIC RATES DURING OVERTIME HOURS. THE DEBIT TO THIS ACCOUNT WILL BE TAKEN FROM THE MONTHLY COMPUTER PRINT OUT.
805	PAID HOLIDAYS	MONTHLY AMOUNT PROVIDED TO COVER PAID STATUTORY HOLIDAYS AND ANNUAL LEAVE FOR WHICH PAYMENT HAS TO BE MADE. THIS IS CALCULATED BY THE ACCOUNTS OFFICE.
806	WORKS SALARIES	MONTHLY DEBIT FOR SALARIES PAID TO WORKS PERSONNEL - DIRECT AND INDIRECT. ALSO ANY ANNUAL ADJUSTMENT TO THE PAID LEAVE PROVISION NECESSARY ON BEHALF OF SUCH WORK'S PERSONNEL.
807	STATUTORY DEDUCTIONS: - EUROPEAN	ALL COMPANY CONTRIBUTIONS FOR HOURLY PAID LABOUR FOR SICK PAY FUND, UNEMPLOYMENT INSURANCE FUND, TRANSVAAL REGIONAL COUNCIL LEVY AND BANTU SERVICE LEVY. NO PROVISION IS CREATED FOR SPLIT WEEKS AT MONTH END.
808	- BANTU	
809	ANTHRACITE	COST OF FUEL USED BY S.I.P.
810	SASOL GAS	
811	PRODUCER GAS TARIFF	THE MONTHLY CHARGE FOR PRODUCER GAS, USAGE BEING CHARGED ON A TARIFF BASIS.

OPERATING COSTS (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
812	COAL	COST OF FUEL USED BY S.I.P.
813	FUEL OIL	COST OF FUEL OIL USED ON MELT SHOP LADLES, AND BY S.I.P.
814	OXYGEN	CHARGE OUT FOR OXYGEN USED FOR FURNACES AND FETTLING BASED ON ACTUAL USAGE.
815	GRAPHITE ELECTRODES	CHARGE FOR ELECTRODES ISSUED AND MAINTAINED DURING THE MONTH.
816	HEATING CURRENT FOR FURNACES	TOTAL CURRENT USED IN ARC FURNACES BASED ON METER READINGS.
817	ELECTRICITY	THE ELECTRICITY USAGE IN THE WORKS, EXCEPT FOR ARC FURNACES BASED ON ALLOCATION PROVIDED BY ENGINEERING DEPARTMENT.
818	COMPRESSED AIR	THE COMPRESSED AIR EXPENSES SPREAD OVER THE USERS.
819	WATER	WATER CHARGE FOR WORKS SPREAD OVER USERS.
820	PUMPING DAM - WATER RETICULATION	
821	MOULDS AND APPLIANCES	CHARGE FOR ISSUE AND UPKEEP OF MOULDS AND ACCESSORIES IN MELT SHOP AND CONT. CASTING PLANT.
822	ROLLS TARIFF	ROLL CHARGE BASED ON TONNAGE TARIFF.
823	ROLL TURNING	ACTUAL COST OF ROLL TURNING.
824	OTHER MILL APPLIANCES	CHARGE FOR SUNDRY ROLLING APPLIANCES.
825	OPERATING MATERIAL	SUNDRY WORKING MATERIAL E.G. OXYGEN ON COOLING BED, FOUNDRY BOUGHT OUT PARTS.
826	PROPANE GAS	
827	WATER TREATMENT PLANT	
828	DOLOMITE	DESULPHURISING AGENT USED BY S.I.P.
829		
830	CONTINUOUS CASTING PLANT REFRACTORIES	

OPERATING COSTS (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
831	FURNACE BRICK USAGE)	REFRACTORY MATERIAL USED IN THE MELT SHOP ON REPAIR OTHER THAN THOSE CHARGEABLE AGAINST FURNACE LINING PROVISION.
832	LADLE BRICK USAGE)	
833	ROOF BRICK USAGE)	
834	DOLOMITE)	
835	OTHER REFRACTORIES MATERIAL)	
836	REFRACTORIES TRANSFERRED FROM) FURNACE LININGS A/C)	TRANSFERS TO WORKING COSTS
837	WORKSHOP RATES TRANSFERRED) FROM FURNACE LININGS A/C)	
838	WORKSHOP RATES TRANSFERRED) FROM EXTRAORDINARY MAINTENANCE) A/C)	
839	BILLET YARD	A. PREFIX BY C.C. 400/FOR MILLS BILLET YARD B. PREFIX BY C.C. 550/FOR CONCAST BILLET
840	MASS SPECTROMETER	OPERATING & MAINTENANCE CHARGES FOR UNIT ATTACHED TO KRUPP FURNACE.
841	CRANES - OVERHEAD	OPERATING AND MAINTENANCE CHARGE FOR OVERHEAD CRANES INCLUDING ALL LABOUR CHARGES.
842	WORKS TRANSPORT	TRANSPORT CHARGES NOT OTHERWISE ALLOCATED
843	MOBILE HANDLING EQUIPMENT	
844	LABORATORY	TOTAL OPERATING AND MAINTENANCE CHARGE FOR LABORATORY
845	TESTING	TESTING OF BARS BY WORKSHOPS FOR ROLLING MILL AND CONTINUOUS CASTING PLANT
846	STRAIGHTENING AND GRINDING	FINISHING WORK DONE BY DESPATCH
847	IRRECOVERABLE COSTS - SCRAPPED PRODUCTS	CHARGES TO PRODUCTION UNITS WHERE COSTS WERE INCURRED FOR FAULTY PRODUCTS SUBSEQUENTLY SCRAPPED.
848	STORES DIFFERENCES	INVENTORY ADJUSTMENTS.
849	MISCELLANEOUS OPERATING COSTS	WORKS COSTS THAT CANNOT BE ATTRIBUTED TO OTHER DIVISIONS OF COST.
850	MISCELLANEOUS CREDITS	ANY WORKS CREDITS THAT CANNOT BE ALLOCATED TO OTHER DIVISIONS OF COST.

OPERATING COSTS (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
851	FURNACE LINING TARIFF	MAJOR FURNACE LINING PROJECTS ARE COVERED BY A TONNAGE TARIFF CREDITED TO A PROVISION.
852		
853	S.I.P. TERTIARY PIPES TARIFF	
854		
855	BRICKS - OWN MANUFACTURE (FOR FURNACE LININGS)	
860	MAINTENANCE MATERIAL TRANSFERRED FROM EXTRAORDINARY MAINTENANCE CONTROL ACCOUNT	
861	SPECIAL MAINTENANCE LABOUR	COST OF DIRECT LABOUR CHARGED TO MAINTENANCE DUTIES.
862	MAINTENANCE MATERIAL	ALL MATERIAL PURCHASED AND ISSUED FROM STORES FOR SPECIFIC MAINTENANCE JOBS, OTHER THAN MAJOR PROJECTS CHARGEABLE TO PROVISION.
863	SPARE PARTS FOR MACHINES	
864	WORKSHOP - BLACKSMITHS)	
	)	
865	- BRICKLAYERS)	
	)	
866	- CARPENTERS)	
	)	
867	- ELECTRICIANS)	
	)	
868	- FITTERS)	EXPENSES INCURRED BY VARIOUS MAINTENANCE SHOPS IN WORKS. ALLOCATION BASED ON EUROPEAN LABOUR HOURS IN EACH COST CENTRE
	)	
869	- GREASERS)	
	)	
870	- MACHINE SHOP)	
	)	
872	MAINTENANCE BY OUTSIDE CONTRACTORS	AMOUNTS INVOICED BY OUTSIDE CONTRACTORS FOR MAINTENANCE CONTRACTS OR JOBS, OTHER THAN THOSE CHARGEABLE AGAINST PROVISION.
873	MAINTENANCE TARIFF	MONTHLY TARIFF BASED ON TONNAGE OUTPUT CREDITED TO PROVISION.

OPERATING COSTS (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
874	SPECIAL COMPONENTS BOUGHT OUT FOR SPECIFIC PRODUCTION ORDERS (FOUNDRY)	
875	DIRECT PATTERN MATERIALS	
876	DIRECT CHARGEABLE MATERIALS (FOUNDRY)	
877	SANDS AND BINDERS	
878	CUTTING GASES	
886	CREDIT FOR REPAIR SCRAP	
887	STRAIGHTENING TM AND GB's	
888	FUME CLEANER/SCRAP PREHEATER	OPERATING AND MAINTENANCE CHARGES FOR UNIT COUPLED TO KRUPP FURNACE
890	DEPRECIATION	DEPRECIATION ON PLANT AND MACHINERY ENGAGED ON DIRECT OPERATIONS.
891/896	WORKS SERVICES - SEE NEXT PAGE	

WORKS SERVICES

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
891	DRAWING OFFICE	TOTAL COSTS OF OFFICE, BOTH OPERATION AND MAINTENANCE.
892	WORKS SECURITY	TOTAL COSTS, ARMoured CAR INCLUDED IN TOTAL.
893	PURCHASE OFFICE	TOTAL COSTS OF OFFICE, OPERATION, MAINTENANCE.
894	STORES AREA	TOTAL COSTS OF STORES AREA, OPERATION AND MAINTENANCE.
895	WORKS INSURANCE	MONTHLY WRITE-OFF AGAINST PRE-PAYMENT ACCOUNT.
896	RATE CHARGE	MONTHLY WRITE-OFF AGAINST PRE-PAYMENT ACCOUNT.

MATERIAL USAGE

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
901	BASIC PIG IRON ISSUES	)
902	CAST IRON SCRAP ISSUES	)
903	SCRAP (GENERAL) ISSUES	)
904	SPONGE IRON PLANT ISSUES	)
905	IRON ORE ISSUES	)
906	MANGANESE ORE ISSUES	)
907		
908	S.I.P. IRON ORE USAGE	
909	S.I.P. REJECT/WASTE IRON ORE	

CARTAGE AND CONVERSION COSTS - THIRD PARTIES

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
911	CARTAGE COSTS ON INGOTS DELIVERED FOR ROLLING	
912	CHARGES FOR ROLLING BILLETS EX OWN INGOTS	
913	CARTAGE CHARGES ON BILLETS ROLLED EX OWN INGOTS	
914	CARTAGE CHARGES ON CROP ENDS RETURNED	
915	CROP ENDS EX BILLETS ROLLED	

MATERIAL USAGE (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>STORES CODE</u>	<u>REMARKS</u>
920	FERRO-MANGANESE 70/75%	19/3 (19003)	
921	FERRO-MANGANESE 80/85%	19/4 (19004)	
922			
923	SILICON-MANGANESE 68%	19/19 (19109)	
924	ELECTROLYTIC MANGANESE 99%	19/12 (19102)	
925	FERRO-SILICON 45/50%	19/7 (19007)	
926	FERRO-SILICON 70/75%	19/11 (19101)	
927	CALCIUM SILICIDE	19/15 (19105)	
928			
929			
930	FERRO-CHROME 55% CR /0.03% C	19/2 (19002)	
931	FERRO-CHROME 60/62½% CR/6.0% C	19/1 (19001)	
932	FERRO VANADIUM	19/8 (19008)	
933			
934	FERRO-MOLYBDENUM 63% MO	19/23 (19113)	
935	FERRO-MOLYBDENUM 72.8% MO	19/10 (19010)	
936			
937	COPPER	19/18 (19108)	
938			
939	ALUMINIUM	37/2 (37002)	
940	CALLOY	19/16 (19106)	
941	NICKEL	19/5 (19005)	
942	SULPHUR	10/5/1 (10005)	
943	NICKEL CHROME	19/21 (SCRAP) 19/22	
944			
945	MOLYBDIC OXIDE BRIQUETTES 51.6%	19/28 (19118)	

MATERIAL USAGE (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>STORES CODE</u>	<u>REMARKS</u>
946			
947			
948	FERRO-NIOBIUM	19/6 (19006)	
949			
950			
951	UNSLAKED LIME	23/5 (23005)	
952	LIMESTONE	23/6 (23006)	
953	FLUORSPAR	23/4 (23004)	
954	GRAPHITE DUST	23/1 (23001)	
954	ANTHRACITE CHIPS	23/16 (23010)	
955	RAW DOLOMITE	23/3 (23003)	

MATERIAL USAGE (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
967	STOCK ADJUSTMENT - INGOTS	
968	STOCK ADJUSTMENT - BILLETS	
969	STOCK ADJUSTMENT - BARS	
970		
971	INGOTS USED IN WORKS	
972	BILLETS USED IN WORKS	
973	STEEL BARS USED IN WORKS - TMB/GB - 22"/18" MILL	
974		
975	STEEL BARS USED IN WORKS - MEDIUM 12" MILL	
976	STEEL BARS USED IN WORKS - LT. 18"/12"/11" MILL - SIEMAG	
977		
978	STEEL BARS USED IN WORKS - 22"/18" MILL	
979	STEEL CASTINGS USED IN WORKS	
980	STEEL CASTINGS TRANSFERRED OUT - STANDARD BRASS, IRON & STEEL FOUNDRIES LTD.	
981	SHORT INGOTS	
982	STEEL SKULL	
983	OTHER MELTING SHOP AND CONT. CASTING PLANT SCRAP	
984	INGOTS SCRAPPED	
985	BILLETS SCRAPPED	
986	SCRAPPED SPONGE IRON	
987	CROP ENDS	
988	BARS AND SECOND CROP ENDS SCRAPPED	
989	SALEABLE CROP ENDS	
990	UNLOADING OF RAW MATERIALS	

MATERIAL USAGE (CONT.)

<u>A/C CODE</u>	<u>ACCOUNTS DESIGNATION</u>	<u>REMARKS</u>
991	WORKS RAILWAY	
992	SCRAP PREPARATION: CONTRACTORS	
993	SCRAP PREPARATION: D.I.S.W.	
994	SALEABLE CROP ENDS	
995		
996	STEEL BILLETS PURCHASED	
997	RESIDUAL MATERIAL OTHER THAN RETURNED TO SCRAP	
998	30" COGGING MILL - RESIDUALS NOT SCRAPPED	

1. Budgets

1. OVERHEAD COMPARISON ACTUAL TO BUDGET FOR PERIOD ENDED

ACCOUNT NO.	DESCRIPTION	Month of 19				For Months Ended 19			
		Actual	Budget	Variance		Actual	Budget	Variance	
				Adverse	Favourable			Adverse	Favourable
401	Secretarial	Salaries and Wages							
402		Postages, Telephones, etc.							
403		Printing and Stationery							
404		Legal Expenses							
405		Insurance - General							
406		Bad Debts							
407		Staff Refreshments							
408		Publications							
409		Subscriptions							
410		Iscor Co-ordinating Council							
411		General Expenses							
		<u>TOTAL:</u>							
421	Accounts	Salaries and Wages							
422		Office Machinery Rental							
423		Office Machinery Maintenance							
424		Time Office Expenses							
425		Bank Charges							
426		Audit Fees							
427		Consultants Fees							
428		Depreciation - Office Equipment							
431		General Expenses							
432		Computer Expenses							
433		Printing Services - Own							
434		Accounting Machine Centre							
		<u>TOTAL:</u>							
441	General	Car Expenses							
442		Office Maintenance							
443		Management Remuneration							
444		Directors Fees							
445		Company Houses							
446		Entertainment							
447		Overseas Travelling							
448		London Office							
449		Johannesburg Office							
450		Depreciation - Office Furniture							
451		Miscellaneous							
		<u>TOTAL:</u>							
848	Stores Differences	<u>TOTAL:</u>							

1. OVERHEAD COMPARISON ACTUAL TO BUDGET FOR PERIOD ENDED

(Cont. from Page 1)

-PAGE 2

ACCOUNTS NO.	DESCRIPTION	Month of 19				For Months Ended 19			
		Actual	Budget	Variance		Actual	Budget	Variance	
				Adverse	Favourable			Adverse	Favourable
891	Works Services	Drawing Office							
892		Works Security							
893		Purchase Office							
894		Stores Area							
895		Work Insurance							
896		Rate Charges							
		<u>TOTAL:</u>							
601	Welfare Services	Company Contributions - Pension							
603		- Medical Aid							
604		- U.I.F.							
605		Workmen's Compensation Insurance							
621		Personnel Office Expenses							
631		Staff Training							
632		Coffee Machines							
633		Employees Welfare							
634		Medical Services							
641		Compound - Salaries and Wages							
642		- Soup Kitchen & Beer							
651		- General							
		<u>TOTAL:</u>							
	<u>SUMMARY:</u>								
	1. Administration Services								
	01. Secretarial								
	02. Accounts								
	03. General								
	04. Stores Differences								
	<u>TOTAL:</u>								
	2. Works Services								
	3. Welfare Services								
	<u>TOTAL OVERHEADS:</u>								

19

DUNSWART IRON AND STEEL WORKS, LIMITEDA/C 820 - OPERATING COSTS - PUMPING DAM - WATER RETICULATION AS AT 30TH JUNE, 1974

1. Ledger Balance R85 243,26

2, Constitution:

2,1	Bantu Wages - Service & Auxilliary Dept	7 306,05	
2,2	Bantu Leave pay - Service & Auxilliary Dept.	.688,60	
2,3	Apportionment charges other Service Centres	17 788,16	
2,4	Actual Payment	25 805,31	
2,5	Estimate - Extra Ordinary Accounts	53 158,51	
2,6	Laboratory Salaries charged out	580,15	
2,7	Depreciation	649,02	
2,8	Maintenance Materials	20 327,94	
2,9	Anikem Chemicals	980,15	
2,10	Maintenance outside Contractors	1 624,00	
2,11	Extra Ordinary Maintenance	3 781,40	
2,12	Electricity	8 242,12	
2,13	Repairs - Pump Impeller	88,80	
2,14	European - Wages Service Auxilliary Dept.	7 233,68	
2,15	European leave pay Service Auxilliary Dept.	596,87	
2,16	Metal & Engineering Training Fund	23,40	148 874,16

LESS:

Reversal of Previous months Estimates	%.	29 254,65	
Estimate usage Continuous Casting Plant	%.	2 700,00	
Apportionment charges to other Service Centres	%.	14 959,16	
Water Reticulation works Overhead Dept.	%.	<u>16 717,09</u>	<u>%.</u> 63 630,90
			R85 243,26

AS PER 1 ABOVE

R85 243,26

19

Page 1

870

[illegible]

ANNEXURE 20

A. PRODUCTION COST CENTRES

	864		865		866		867		868		869		870			
COST CENTRE CODE	BLACKSMITHS		BRICKLAYERS		CARPENTERS		ELECTRICIANS		FITTERS		GREASERS		MACHINE SHOP		TOTAL VALUE	
	Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	R	R
300																
310																
320																
330																
340																
400																
410																
411																
412																
413																
420																
421																
422																
423																
424																
440																
441																
442																
443																
450																
451																
452																
454																
455																
456																
460																
461																
550																
570																
TOTAL																

SERVICE AND AUXILIARY DEPARTMENTS

1. (Estimates) Serving Other Service/Auxiliary Departments.

WORKSHOPS

19

Page 3

		864		865		866		867		868		869		870					
		BLACKSMITHS		BRICKLAYERS		CARPENTERS		ELECTRICIANS		FITTERS		GREASERS		MACHINE SHOP		TOTAL VALUE			
		Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	R		R	
100	814																		
100	817																		
100	818																		
100	820																		
100	841																		
300	841																		
310	841																		
400	841																		
410	841																		
550	841																		
100	842																		
100	843																		
320	855																		
100	864																		
100	865																		
100	866																		
100	867																		
100	868																		
100	869																		
100	870																		
TOTAL																			
100	631																		

ANNEXURE 20 (ii)

B. SERVICE AND AUXILIARY DEPARTMENTS

2. Not Serving Other Service/Auxiliary Departments (Non-Estimates)

WORKSHOPS

19

Page 4

864

865

866

867

868

869

870

		BLACKSMITHS		BRICKLAYERS		CARPENTERS		ELECTRICIANS		FITTERS		GREASERS		MACHINE SHOP		TOTAL VALUE	
		Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	Hours	R	R	R
320	815																
340	821																
	823																
400																	
422																	
423																	
442																	
452																	
454																	
	824																
400	839																
550	839																
320	840																
100	844																
400																	
454																	
550																	
	845																
400	846																
C/Fwd.																	

B. SERVICE AND AUXILIARY DEPARTMENTS - 2. Not Serving Other Service/Auxiliary Departments (Non-Estimate) (Cont.)

WORKSHOP

19

864

865

866

867

868

864

87

[illegible]

ANNEXURE 20 (iv)

C. WORKS OVERHEADS

WORKSHOPS 19

		864			865			866			867			868			869			870						
COST CENTRE CODE	ACC'S CODE	BLACKSMITHS			BRICKLAYERS			CARPENTERS			ELECTRICIANS			FITTERS			GREASERS			MACHINE SHOP			TOTAL VALUE			
		Hours	R		Hours	R		Hours	R		Hours	R		Hours	R		Hours	R		Hours	R		R		R	
100	891																									
	892																									
	893																									
	894																									
	621																									
	633																									
	634																									
	642																									
	651																									
	407																									
	411																									
	424																									
	431																									
	441																									
	442																									
	451																									
	119																									
TOTAL																										

D. SELLING AND DISTRIBUTION EXPENSES

100	507																									
TOTAL																										

DISTRIBUTION OF ELECTRIC POWERA. PRODUCTION COST CENTRES

Cost Centre			Power	Light	Total kWh	Value	
310	<u>SCRAP YARD</u>						
	i) Sapon Baler		.....	.....			
	ii) Shears		.....	.....			
320	<u>ELECTRIC FURNACES</u>						
	i) Auxiliaries - D1	⊗	19247	.....			
	D2	⊗	19238	.....			
	D3	⊗	38483	.....			
	D4	⊗	38483	.....			
	Krupp	⊗	76966	.....			
	ii) Pumps, Lights, Fans		.....	.....			
	iii) Dolomite Crusher		.....	.....			
					192417	967	95
330	<u>LADLE MAINTENANCE</u>						
	Fans and Transfer Bogies	✓	10516	14340	24856	125	04
340	<u>CASTING BAY</u>			42026	42026	211	41
400	<u>ROLLING MILLS - GENERAL</u>						
	<u>30" COGGING MILL</u>						
410	i) General 384312	⊗	192156	42290	234446	1179	38
411	ii) Gas Fired Soaking Pits	⊗	192156		192156	966	64
412	iii) Rolling	x	485560		485560	2442	61
413	iv) Elpits	x	856560		856560	4308	92
	<u>22/18" MILL</u>						
420	i) General 102618	⊗	51309	22961	74270	373	61
421	ii) Re-heating Furnace	⊗	25655		25655	129	06
422/3	iii) Rolling	x	392400		392400	1973	96
424	iv) Cooling Bed	⊗	25654		25654	129	06
	C/Fwd.				2546000	12807	64

DISTRIBUTION OF ELECTRIC POWER

19

Cost Centre			Power	Light	Total kWh	Value	
		B/Fwd.			254 6000	12807	64
	<u>12" MILL</u>						
440	i) General 21 788	⊗	40 894	5348✓	46 242	232	62
441	ii) Re-heating Furnace	⊗	20 447		20 447	102	86
442	iii) Rolling	x	119 407		119 407	600	68
443	iv) Cooling Bed	⊗	20 447		20 447	102	86
	<u>12" LIGHT SECTION MILL</u>				<u>706 543</u>		
450	i) General 102 200	⊗	51 100	30 120✓	81 220	408	58
451	ii) Re-heating Furnace	⊗	25 550		25 550	128	53
452	iii) Roughing Train	{ x	156 355		156 355	786	54
454	iv) Finishing Train	{ x	156 355		156 355	786	54
455	v) Coiling						
456	vi) Cooling Bed	⊗	25 550		25 550	128	53
					<u>445 030</u>		
460	<u>MILLS DESPATCH</u>		77 140		77 140	388	05
461	<u>RE-CUTTING SECTIONS AND BARS</u>		25,000		25 000	125	16
550	<u>CONTINUOUS CASTING PLANT</u>		176 754	71 701✓	248 455	1249	85
570	SPONGE IRON PLANT X		457 474		457 474	2301	32
	<u>TOTAL PRODUCTION COST CENTRES: /817</u>				400 564	20150	36

B. Accounts Code320/816 HEATING CURRENT FOR ELECTRIC FURNACES

		15 778 579	79374	03
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DISTRIBUTION OF ELECTRIC POWER

19

C. SERVICE AND AUXILIARY DEPARTMENTS

Acc's Code		Power	Light	Total kWh	Value	
100/991	Works Railway		14340	14340	72	14
100/814	Oxygen Plant					
100/818	Compressed Air	X: 298296		298296	1500	58
100/820	Pumping at Dam/Water Reticulation	X 202986		203986	1021	12
400/823	Roll Lathe Shop	53509	2620	56129	282	36
550/827	Water Treatment Plant					
400/839	Billet Yard	16381		16381	82	40
550/839	Billet Yard	10921	701	11622	58	46
	<u>Works Cranes</u>					
300/841	Scrap Yard Area	27303				
300/841	Melt Shop Area	X 13508				
400/841	Mills Area	3348				
550/841	Continuous Casting Plant Area	X 5260				
				49419	248	60
100/842	Works Transport	5777		5777	29	06
100/844	Laboratory	(X) 19716		19716	99	18
400/846	Straightening & Grinding (Excluding TMB Machines)					
100/854	Workshops - Blacksmiths	(X) 19716		19716	99	18
100/855	- Bricklayers					
100/856	- Carpenters	(X) 2374		2374	11	94
100/857	- Electricians	(X) 9858		9858	49	59
100/858	- Fitters	(X) 13144		13144	66	12
100/870	- Machine Shop	X 7126		7126	35	85
400/857	Straightening TMB & GS	10921	12460	23381	117	62
300/888	FUME CLEANER / SCRAP PREHEATER	X —				
100/184	Gas Producer Plant	(X) 244576	8900	253471	1275	08
	<u>TOTAL SERVICE & AUXILIARY DEPARTMENTS:</u>			1003736	5049	28

JV 93

DISTRIBUTION OF ELECTRIC POWER

Aug 1971

WORKS OVERHEADS

Acc's Code		Power	Light	Total kWh	Value
100/892	Works Security		6824	6824	34 33
100/893	Purchase Office		2000	2000	10 06
100/894	Stores Area		4000	4000	20 12
100/633	Changehouses	X	59600	59600	299 82
100/651	Compound - General	X	23483	23483	118 13
100/442	General Offices		10040	10040	50 50
	<u>TOTAL WORKS OVERHEADS:</u>			105947	532 96

N94.

MISCELLANEOUS

100/167	Canteen		3286	3286	16 54
	HECKETT X	9879		9879	49 70
	<u>TOTAL MISCELLANEOUS:</u>			13165	66 24

512490

ELECTRIC POWER USAGE

19

(To be completed by Electrical Department)

A. ELECTRICAL FURNACES (Melting Current)

		kwh	kW		Production - Tons
Demag 1	x	327072		825	396
Demag 2	x	27240		905	97
Demag 3	x	3712500		459.9	8071
Demag 4 <i>METER FAULTY</i>	? x	3576490		544.78	6565
Krupp	x	8074677		546.02	14788
<u>Total Melting Current:</u>		15778579			

B. MELT SHOP AREA - AUXILIARIES

i. Scrap Yard					
ii. Furnaces					
iii. Ladle Maintenance					
iv. Casting Bay					
<u>Total Melt Shop Auxiliaries:</u>					

C. ROLLING MILLS (Show total usage for each Mill)

30" Mill	x	485560		31.346	15247
Elpils	x	856560		161.92	5290
22/18" Mill	x	393400		51.22	7661
12" Medium Mill	x	119407		28.089	4251
12" Light Mill	x	312710		61.496	5085
<u>Total - Rolling Mills:</u>	x	2166637			16994

D. MILL DESPATCH - Total UsageE. TOTAL PRODUCTION COST CENTRES(A + B + C + D) *HECKETTS 9879* xF. REMAINDER OF PLANT INCLUDING HECKETTTOTAL USAGE - PER READINGS:

2961853			
20907069			

DUNSWART IRON & STEEL WORKS, LIMITED

(INCORPORATED IN THE REPUBLIC OF SOUTH AFRICA)

MANUFACTURERS OF ROLLED SECTIONS IN MILD, CARBON AND ALLOY STEEL.
LLOYDS' REGISTRY OF SHIPPINGS' APPROVED LIST.TELEPHONE 54-8331 (10 LINES)
TELEGRAMS "ELMWOOD" BENONI
TELEX JX 0263RAILWAY SIDING 101
BOKSBURG EAST

Your Ref.

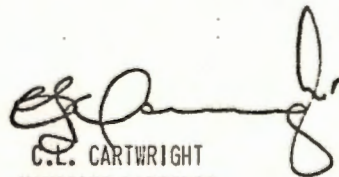
P.O. BOX 290,
BENONI.

Our Ref.

19..

The Dean of the Faculty,
University of Potchefstroom,
POTCHEFSTROOM.

I, the undersigned hereby authorise MR. C.F.O. RADEMAN to use extracts
of this company's literature, systems, publications etc. as may be
deemed necessary by him for academic purposes.


C.L. CARTWRIGHT
MANAGING DIRECTOR

ALL AGREEMENTS MADE CONTINGENT UPON STRIKES, FIRES, ACCIDENTS OR OTHER CAUSES BEYOND OUR CONTROL

DIRECTORS: DR. F. A. ZOELLNER (GERMAN) (CHAIRMAN)
C. L. CARTWRIGHT, K. SCHERER (AUSTRIAN), (JOINT MANAGING DIRECTORS)
W. B. COETZER, H. JACKSON (BRITISH), O. M. PAEFGEN (GERMAN)
M. E. RICH (BRITISH), B. M. SAAGER (SWISS), K. C. WHYTE D.S.O., D.F.C.
ALTERNATES: O. W. NOTHARD, E. A. THURMAN (BRITISH)

SUMMARY

The object of this research project was to present management control in its true perspective, and to illustrate empirically the efficacy of costfinding as a means of fast reporting and automatic control.

This project consists of three sections viz:

SECTION I - GENERAL

Chapters 1 and 2 derive the theory of management control and its corollary the concept of costfinding. The scope, origin, application, and contemporary need for these controls are summarised.

SECTION II - DUNSWART IRON AND STEEL WORKS, LIMITED

Chapters 3 to 7 is a review of the need for change and scientific control; of the decision to instal costfinding with the reporting aspect in the format of the German Uniform Costing system for the steel industry; and of the compromises necessary, and the means available to implement the changes. Finally there is an empirical review of costfinding.

SECTION III - CONCLUSION

Chapter 8 evaluates the project and finds that there is justification for the opinion that costfinding achieved its goal, satisfied the basic objectives of internal control, and complied with auditing standards.

ZUSAMMENFASSUNG

Der Zweck dieses Forschungsvorhabens war es, Betriebswirtschaftliche Unternehmensfuehrung (Management Control) in ihrer richtigen Perspektive darzustellen. Weiterhin sollte die Wirksamkeit der Kostenrechnung (Costfinding) als Mittel zur schnellen Berichterstattung und selbsttaetigen Kontrolle an Hand von Beispielen erlaeutert werden.

Die Untersuchung besteht aus drei Abschnitten:

ABSCHNITT I - ALLGEMEIN

Kapitel 1 und 2 beziehen sich auf die Theorie der Betriebswirtschaftlichen Unternehmensfuehrung und der daraus abgeleiteten Kostenrechnung. Umfang, Ursprung, Anwendung und gegenwaertiger Bedarf fuer diese Kontrollfunktioneng werden summarisch behandelt.

ABSCHNITT II - DUNSWART IRON AND STEEL WORKS, LIMITED - ERFABRUNGEN

Kapitel 3 bis 7 begruenden die Notwendigkeit einer Umstellung auf eine wissenschaftliche Unternehmenskontrolle. Die Einfuehrung von Kostenrechnung mit Berichterstattung gemaess dem einheitlichen Kostenrechnungssystem fuer die Deutsche Eisen- und Stahlindustrie. Die notwendigen Kompromisse und die vorhandenen Mittel fuer die Durchfuehrung der Aenderungen. Bericht ueber Erahrungen mit diesem Kostenrechnungssystem.

ABSCHNITT III - SCHLUSSFOLGERUNGEN

Dieses Kapitel wertet die Untersuchung aus und kommt zu dem Schluss, dass die Ansicht berechtigt ist, das neu eingefuehrte Kostenrechnungssystem habe sein Ziel erreicht, weil es die grundsaeztlichen Aufgaben der internen Kontrolle erfuehlt und den Buchpruefungs-Anforderungen entspricht.

RADEMAN C F O

Unternehmensfuehrung mit Hilfe der Kostenrechnung unter besonderer Beruecksichtigung eines Unternehmens der Stahlindustrie (DUNSWART IRON AND STEEL WORKS, LIMITED, Firmengruppe).

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