Dissertation

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An empirical study of plant and machinery evaluation techniques in Lagos metropolis

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AN EMPIRICAL STUDY OF PLANT AND MACHINERY VALUATION TECHNIQUES IN LAGOS METROPOLIS

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BEING THE FULL TEXT OF A THESIS SUBMITTED TO THE DEPARTMENT OF ESTATE MANAGEMENT, FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT, OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE

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ABSTRACT

This thesis represents a pioneering attempt at critically examining the different approaches to plant and machinery valuation from both the engineers', and estate surveyors and valuers' perspectives in Nigeria.

Questionnaires (backed up with oral interview) were administered on a random sample of engineering and estate surveying firms within Lagos Metropolis. The data were analysed by means of descriptive statistics.

The study revealed arbitary adoption of Depreciated Replacement Cost (DRC) approach for the plant and machinery valuations without consideration for the level of company's profit, basis possibility of alternative use and assets having trading potentials. It was also observed that the estate surveying firms were more involved in plant and machinery valuations than the engineering firms.

The study suggested, amongst others, that DRC approach should always be subject to test of adequate profitability and, in addition, that the possibility of higher alternative use values be considered, especially, for surplus or redundant plant and machinery assets. It was also recommended that the Nigerian Institution of Estate Surveyors and Valuers should establish Plant and Machinery Valuation Option for the training of plant and machinery valuers.

CHAPTER ONE

BACKGROUND TO THE STUDY

1.0 INTRODUCTION

The valuation of plant and machinery which, according to Foord (1980), developed with the growth of industrial age, began to gain a significant bearing in the nation's development in 1970's due to economic boom. The accompanied valuation briefs then were handled by the estate surveyors and valuers in accordance with the Decree No 24 of 1975 whilst the engineers, under Decree 55 of 1970, prepared the technical reports on plant and machinery for such valuations (Okunlola, 1990).

Lately, the valuation of plant and machinery has attracted a lot of attention. For instance, engineers are claiming competence whilst the estate surveyors and valuers are disputing their claim. Precisely, the build-up to the current outburst began effectively early in 1988, when a workshop to preview the companies and allied matters decree was convened (Okunlola, op. cit.)

Several reasons can be attributed to this interest. Prominent amongst these are; a considerable significance which plant and machinery components have acquired based on their high

import duties and the overall effects on the joint valuation; public criticism of or displeasure with plant and machinery valuations which Anyaeji (1990) claimed the Nigerian Society of Engineers (NSE) is being blackmailed for; decline in the nation's construction projects due to economic recession; and lack of clear understanding of what plant and machinery valuation stands for. Therefore, the essence of this study is to examine the different approaches to plant and machinery valuations from the viewpoints of estate surveyors and valuers on the one hand and engineers on the other hand.

1.1 THE STATEMENT OF THE PROBLEM

The crux of the matter could be linked to changing technology and the introduction of the Structural Adjustment Programme (SAP) by the Federal Government to mention a few, which make demands for the services of plant and machinery valuers more than ever before to be on the increase. Thus, the issue of who is a valuer of plant and machinery became necessary (Adegbemile (1991), Obialo (1991).

In addition to this, prior to the promulgation of the new Companies and Allied Matters Decree of 1990, engineers were recognised as experts in the old law for the purposes of valuation. But different requirements were laid down under section 137

of the new companies law for the definition of a valuer for the purpose of determining the value of considerations other than cash which a company accepts for its shares. Valuer is defined in this section as "an auditor", a valuer, a surveyor or an accountant not being a person in the employment of the company nor an agent or associate of the company or any of its directors or officers". This therefore contradicts section 554 of the same decree which recognises engineer as an 'expert', amongst others, for the purposes of determining payments for shares under a prospectus. Could this then be taken as a deliberate attempt or an oversight on the part of the law makers as to the expertise of engineers in the area of valuation discipline?

Quite distinct from the above, the term 'land' could also be viewed from different perspectives depending upon the context and the circumstances under which it is used. According to Barlowe (1978), it includes both natural and man-made resources over which the possession of the earth surface gives control. To the lawyers it has to do with all corporeal things subjacent and superjacent to the soil and annexed thereto; and in their language, 'quid quid plantatur solo solo cedit' (Megary and Wade (1966), Omotola (1988), James (1973)). From the foregoing, plant and machinery being essentially

fixed items in land could therefore be combined with the valuation of interests in land. This probably meets with Denman's (1958, 1978) approval in the use of the phrase 'estate in land' to embrace all rights an owner of land has over his land and those capital resources which at law are themselves land. Could this therefore be taken as one of the reasons why estate surveyors and valuers are recognised in the country as experts to the exclusion of engineers in the valuation of plant and machinery? Can the estate surveyors and valuers still continue to hide under this premise to value moveable plant and machinery which depends upon the law of chattels? Or, do we have to refer these plant and machinery assets to engineers for valuation purposes?

Perhaps, one may be quick to add that, it is in apparent recognition of the above, that makes Adegbemile (op. cit) to conclude that modern specialist valuers require knowledge of aspects of accountancy, insurance, legal and real estate valuation professions, and a sound knowledge of the plant and machinery utilised in various industries and trades". This view has been variously expressed by Ojo (1984, 1991), Derry (1979, 1985, 1991), Brown (1991) and Foord (op. cit).

Consequent upon the various views expreseed above, it is pertinent to ask the following questions: Is plant and machinery valuation synonymous with

plant and machinery engineering? To what extent has each of the two professions satisfied the knowledge content of plant and machinery valuation in Nigeria? Where none could satisfy these requirements in their entireties, can this lead us naturally to the conclusion that inter-professional barriers be broken down so that engineers, and estate surveyors and valuers could then amalgamate to provide a wider range of services on plant and machinery valuation concepts? Can value be stated for machinery that do not exist? or, more appropriate, can cost arrived at for some plants with the aid of mathematical formulae based on past information produce a value or an estimated cost? Or, is cost equal to value? What are the bases, methods and procedure of plant and machinery valuation? What are the methods, procedure and problems of depreciating plant and machinery for valuation purposes? What is the current state of art of plant and machinery valuation in the study area? How can we improve upon this? These are some of the relevant questions which the study attempt to address.

1.2 THE NEED FOR THE STUDY

Various studies that have been carried out earlier relate to British industrial experience, and, more specifically, from the point of view of estate surveyors and valuers (see for example Foord op. cit, Ojo (1984, 1991), Derry (1979, 1985, 1991), Brown (1991), Karslake (1979). Thus, the proposed study, apart from being a pioneering research in the area of Nigerian industrial valuations experience, will provide a useful input toward improving the practice of plant and machinery valuations.

Germane to the above, the changing technology and the far-reaching adjustment of our industrial structure brought about with the introduction of the SAP by the Federal Government or obvious changing values in money, due to threatening inflation, create a demand for more and more valuations as owners of property assets including plant and machinery of all sorts seek to keep track of their true worth in current terms. Thus, the spectrum of responsibility of a professional man in these circumstances is much wider than that which has been accepted over the years (Pearce, 1980). This study therefore would assist in the formulation of standards for plant and machinery valuations in Nigeria to ensure codification of good practice.

1.3 AIMS AND OBJECTIVES OF THE STUDY

The results of this study are expected to indicate very precisely:

i. how plant and machinery valuation should be carried out,

ii. how depreciation could be handled in plant and machinery valuations, and,

iii. finally, whether inter-professional barriers could be broken down resulting into amalgamation of engineers', and estate surveyors and valuers' professions on plant and machinery valuation concepts.

It will also endeavour to bring these packages within the reach of the professions to be studied.

Toward these ends/aims, the objectives of the study are:

a. To examine the bases and methods of plant and machinery valuation.

b. To identify the problems of depreciating plant and machinery in the study area.

c. To examine the viewpoints of estate surveyors and valuers, and engineers on plant and machinery valuation.

d. To assess the policy implications of the current practice of plant and machinery valuation in Nigeria with a view to making necessary recommendations and conclusions.

1.4 SCOPE OF STUDY

The study area is the metropolitan Lagos. The areas within this metropolis include Lagos Island, Lagos Mainland, Shomolu, Mushin and Ikeja. Due to cost and time constraints as well as firms concentration much of the studies were carried out in Lagos Island and Mainland.

The major reasons for selecting Metropolitan Lagos and for concentrating most of the analyses on estate surveying and engineering firms in Lagos Island and Mainland are:

i. Most of the companies that normally prepare financial and valuation reports have their head offices located in this area.

ii. Again, most of the engineering and estate surveying firms in the country have their head offices or at least a branch office in Lagos, though widely distributed but with a larger concentration in Lagos Island and Mainland, since it is the seat of all commercial activities (particularly office businesses)

iii. The volume of economic growth of Lagos exceeds that of all other capitals or towns in the country.

iv. Lagos is a primate city, it constitutes a political, administrative and commercial nerve centre.

On the basis of the above reasons and coupled with the fact that the practice of estate surveying and engineering firms are being controlled by their

respective institutions and registration Boards, it is expected that whatever data are collected from the study area will form a general and true representation of what is obtainable in the whole country on the valuation of plant and machinery assets.

1.5 RESEARCH METHODOLOGY

The methods and procedures adopted in carrying out this study are as outlined below.

1.5.1 Literature Search

The theoretical framework was done with the aid of inductive approach of enquiry. The areas covered in the literature review include the purposes, bases, methods, knowledge content, and depreciation techniques of plant and machinery valuation.

Along with this, deductions were made to form a conceptual framework for the study, and, this serves as basis for questionnaire design.

1.5.2 Defining Target Population

The target population for this study are the estate surveying and valuation, and engineering firms in the study area. For assets valuation of

which plant and machinery becomes part of, we must recognise, in accordance to section 137 of the new companies law, the following professionals and statutorily competent groups:

i. auditors,
ii. valuers,
iii. surveyors, and
iv. accountants.

However, by virtue of section 554 of the same companies and allied matters law, 1990, engineers could also be regarded as experts for the purpose of determining payments for shares under a prospectus. And, in accordance with the Decree No. 55 of 1970, engineers undertake design and repair of plants and machinery, and, thus have on ocassions, been called upon to determine and provide condition report and express opinion on depreciation of complex plant and machinery. Therefore, for the purpose of this study, until proven otherwise, engineers are considered as part of the professionals for plant and machinery valuation.

Moreover, in accordance to Decree No. 24 of 1975 that established the Estate Surveyors and Valuers Registration Board of Nigeria, only estate surveyors and valuers were statutorily empowered to value proprietary interest in land. These valuations

are not limited to landed properties although the Decree did not so specify "assets valuation". But, the professional scale of charges for estate surveyors and valuers approved by the Federal Government provide scale for the valuation of such other assets as the "plant and machinery", "furniture and fittings", etc.

Finally, the accountants or auditors share the estate surveyors and valuers' interest in feasibility and viability studies as well as in assets valuation. They also undertake the annual preparation of the accounts of limited liability companies which are mandatory. More than that, some of the requirements of the new companies decree of 1990, specify the nature of the preparation of the balance sheet and the manner of arriving at assets value. Therefore, the accountants in the discharge of this statutory provision, regarding the balance sheet of a company, are thus, called upon to carry out valuation for assets (plant and machinery inclusive) and express opinion of value.

But, accountants or auditors are not considered in this study since, unlike engineers and estate surveyors, they adopt historical costs of plant and machinery assets instead of current costs or values. Thus, as the study is more of the bases, methods and procedure of plant and machinery valuation and not basically on concepts, then the findings would

not in any way be impaired. Furthermore, firms were sampled rather than individuals because by the law of this country only firms could practice and not individuals.

1.5.3 Sampling Frame

For adequate coverage and completeness, references were made to current list or directory (1991) of registered firms of estate surveying and valuation in the study area prepared by the Nigerian Institution of Estate Surveyors and Valuers (NIESV). As a result of the unavailability of similar information from either the Nigerian Society of Engineers (NSE) or Council of Registered Engineers of Nigeria (COREN), references were made to 1991 Building Construction Directory and the list of approved engineering consultants who are presently working with estate surveying firms in NEPA assets valuation. The reason for the absence of this information being that NSE and COREN only maintain unlike NIESV, the list of the individual registered engineers.

1.5.4 Sampling Size

The sample size for this study is 17 each of both respondent firms. Initially 60 firms each out of 126 and 91 of estate surveying and engineering

firms respectively were selected to cover, at least, half of both respondent firms, but for the low responses. For instance, out of the 60 firms each, 15 and 22 of estate surveying and engineering firms respectively declined while 28 of the questionnaires returned by the estate surveying firms and 21 others returned by the engineering firms were not useable. Equal samples were therefore taken for objectivity or uniformity purposes and moreso, that their practices were being controlled by their respective registration boards: The Council of Registered Engineers of Nigeria (COREN) for the engineers and The Estate Surveyors and Valuers Registration Board of Nigeria (ESVRBN) for the estate surveyors and Valuers. Therefore, the sample size would adequately represent the practice of plant and machinery valuation in the study area.

1.5.5 Data Collection

The instrument used in collecting data were self-administered questionnaires (interview schedule - see Appendix 1) backed up with oral interviews and content analysis of valuation and technical reports prepared by these firms. Oral interviews through face to face conversations were used. Some pilot tests of the questionnaires were done as a basis for modification of some questions for clarity

purposes and, in addition, to ensure that adequate checklists were provided. The questionnaires were prepared to elicit information on certain areas like -

- bases and methods of plant and machinery valuation, and,
- methods of depreciating plant and machinery for valuation purposes.

Background information were also sought on the firms, such as, the year of establishment, number of instructions received so far on plant and machinery valuations, and types of valuation - whether technical or valuation proper or both.

1.5.6 Methods of Data Analysis

Data were analysed with the aid of simple descriptive statistics. Since the sample size is too small coupled with the fact that the study concentrates on status/role-equation in the field of plant and machinery valuation and not cause - effect relationship(s), then no meaningful statistical analysis were undertaken. Therefore, percentages and simple descriptive statistics were used in analysing the responses, and these serve as bases for comparative study upon which inferences were later drawn.

1.6 DELIMITATIONS AND LIMITATIONS OF THE STUDY

The study attempted only to examine the pitfalls in the current practice of plant and machinery valuation in the country.

The study did not attempt to determine the contributions of accountants or accounting firms to plant and machinery valuation which should be included for understanding. Since the thesis was used to assess methods of depreciation and, more specifically, to critically examine the practice of plant and machinery valuation, the basis for evaluation is therefore limited to the respondent firms within the thesis.

In addition to the above delimitations, are some limitations or problems encountered during the course of the study.

There were unco-operative attitudes of the firms (both estate surveying and engineering firms) that were surveyed which led to the reduction of sample size from 60 to 17 each of the firms of estate surveying and engineering in the study area.

Again, there is dearth of relevant works or studies on the topic in this country. This, therefore, posed a lot of problems in the course of reviewing literature for this thesis.

However, despite all these delimitations and limitations, information collected are sufficiently adequate for any meaningful and valid conclusions to be made.

1.7 PLAN OF STUDY

This thesis examines plant and machinery valuation techniques in Lagos Metropolis. The aspects considered are the contentious issues between the estate surveying and engineering firms which include depreciation methods in addition to the bases and methods of plant and machinery valuation.

In order to explore the aims of this study as earlier discussed, the thesis, in addition to this chapter which look at the introductory background to the study, consists of four other chapters. The theoretical and conceptual framework was carried out in chapter 2 while chapter 3 dealt with empirical analysis of the data collected. Inferences were later drawn along with their implications in chapter 4 from the data collected.

The thesis finally in chapter 5 gave recommendations and conclusions with a view to harmonizing the different approaches to plant and machinery valuation between members of the two callings.

1.8 DEFINITION OF TERMINOLOGIES

In this thesis unless otherwise so stipulated the following expressions shall have the meanings respectively assigned to them:

i. "asset" means plant and machinery

ii. "industrial valuation" means plant and machinery valuation.

iii. "estate surveyor and valuer" or "estate surveyor" or "estate valuer" means any person registered under the Estate Surveyors and Valuers (Registration, etc) Decree No. 24 of 1975 and subsequent amendments. Thus, "estate surveying" or "estate surveying and valuation" firms as used in this thesis refers to firms of estate surveyors and valuers.

iv. "Engineer" means any person registered under the Council of Registered Engineers (Registration, etc.) Decree No. 55 of 1970 and subsequent amendments. Thus, "engineering firms" as used in this thesis refers to firms of engineers.

v. "surplus plant and machinery" means those assets of an industrial concern or a company declared by directors to be surplus to trading requirements.

vi. "S.A.V.P" means Statements of Asset Valuation Practice.

vii. "Machine" means a tool that fashion out a product or performs an operation, for example a grinding machine, a sewing machine, etc.

viii. "Plant" means a process line where more machines combine to bring out a product, for example, Generating Plant has both alternator and an engine.

CHAPTER TWO

THEORETICAL AND CONCEPTUAL FRAMEWORK

2.0 INTRODUCTION

The valuation of plant and machinery as a specialised branch of valuation involves both quantitative and qualitative problems. Besides, it is a subject of common interest between the professions of engineering, and estate surveying and valuation in Nigeria. Thus, this chapter proposes to examine, amongst other things, the purposes, bases, methods, procedure, depreciation methods, and knowledge content of plant and machinery valuation.

2.1 PLANT AND MACHINERY VALUATION PROCESS

This, as given below, follows the same sequence of procedures adopted for all categories of asset valuation:

i. Defining the purpose of valuation and time of completion,

ii. Establishing the scope of the exercise,

iii. Determining the basis and method(s) of value with due respect to:

- plant register,
- accounting requirements or policies,
- insurance guidelines,
- various trades of plant and machinery,
- current industrial legislations,
- mode of sale
- ownership structure, etc.

iv. Referencing - Inventory and Schedule Compilation,

v. Adjustment for Depreciation, and,

vi. Valuation Proper

This thesis would however, as earlier reiterated, focus on the bases, methods, depreciation assessment and knowledge content of plant and machinery valuation.

2.2 PURPOSES OF PLANT AND MACHINERY VALUATIONS

Plant and machinery valuation report and opinions could be undertaken for as many varied purposes as for which property valuations are required. These include valuations for sale or purchase, takeover and merger, privatisation and commercialisation, rating and taxation debenture, mortgage, floatation, condemnation or compulsory acquisition, nationalisation, investigation, settlement of dispute, probate, insolvency or liquidation, balance sheet, partnership, internal performance analysis, published financial statements, open m market value, insurance, feasibility and viability, and rental purposes. Millington (1988), Britton et al., (1989), Rees (ed.) (1987), Derry (1979, 1985, 1991). These valuations are evident because machinery appraisals are often carried out concurrently with real estate valuation as part of projects to establish the total worth of a manufacturing or service industry undertaking.

The above purposes could however be reduced to three principal valuations (Derry (1985), Brown (1991) and Ojo (1991, 1984)) as follows:

- Financial,
- Open market, and
- Insurance

2.2.1 Financial Valuations

These are required to establish the economic worth of the plant and machinery as an integrated package forming part of a continuing manufacturing operation. For example, balance sheet valuation is expected to show, essentially, a description of the financial state of a firm or enterprise at a given moment of time.

2.2.2 Open Market Valuations

The open market valuations of plant and machinery are required according to Derry (1991) by:

i. sellers wanting to know how much they might expect to achieve,

ii. buyers wishing to know how much to offer,

iii. bankers and lenders for loan security purpose,

iv. accountants handling the affairs of failed companies,

v. accountants investigating companies with financial problems.

2.2.3 Insurance Valuations

These are required to compensate or return the owners of the insured plant and machinery assets to their original position in event of total loss, partial loss or damage by fire, flood or other peril.

To further simplify the purposes of plant and machinery valuation given above, Derry (1991) concluded that every valuation falls into the category of being, either:

a. transaction or event-driven, or,

b. non-event driven.

On the one hand, transaction or event driven valuations are required in respect of plant and machinery where cash or some other interest is to change hands. On the other, non-event driven are for the information of the client or share-holders, board of directors, etc. or for the declaration of the state of the plant and machinery assets either as part of a going concern or as separate individual units.

From the foregoing, whilst open market valuations may be classified as transaction or event-driven, financial valuations may either be event-driven

(e.g. funding, rating and taxation, etc.) or non-event driven (e.g. balance sheet, internal performance analysis, etc.) depending on the reason's for which they are being prepared. Insurance valuations, on the other hand, although, is not an economic or commercial valuation, but may be for the information of the insurer and the insured. Therefore, on this note, the idea of regarding insurance valuation not being an event driven could be put to rest if there is any hazard and insurers are compelled to pay the costs of replacing or repairing the damaged machinery.

A critical perusal of the above categorisations further revealed that open market valuations of plant and machinery may have been covered under financial valuations as described above. Thus, it does not require a separate treatment as done by Derry (1991).

2.3 BASES OF VALUATION

The basis of any valuation depends on the purpose for which it is required (Millington, op. cit Rees (op. cit), Britton et al (op. cit), Kinnard (1971), Derry (1985). For instance, there are two known bases of insurance valuation of plant and machinery: reinstatement with new, and indemnity, since the essence of any insurance policy is to

return the owners of the plant and machinery assets to their original position in case of any incident.

In addition, basic accounting concepts postulate that accounts should be prepared on a going concern basis. Thus, valuations for balance sheet purposes as far as plant and machinery assets are concerned will be "value to the business" which corresponds to the open market value for the existing use of the lands and building (Collingwood (1979), SAVP 16(1990), Derry (1985), Brown (op. cit), etc.) However Collingwood (1979), Powell (1979), Aluko (1989) and Merret et al. (1963) agreed that in the event of any "hope value", the valuer should, at the sametime, draw attention to any higher alternative use value that may attach to the property (including the plant and machinery assets) assuming, of course, that the difference between the values is significant in amount.

In recognition of these two bases, Rayner (1976) said,

> "there is a case for putting two figures of value upon these special properties, one as a part of the functional business and the other - possibility but by no means a lower figure - for the sale on the open market of the land and buildings (including plant and machinery assets) as entities in themselves entirely divorced from the firm".

From the foregoing therefore, four bases of plant and machinery valuations could be identified as follows:

i. Reinstatement,
ii. Indemnity,
iii. Open market value for existing use, and
iv. Open market value for alternative use.

2.3.1 Reinstatement Basis

Here the valuation will be based on the cost of replacing the existing assets with identical or substantially similar equipment at manufacturers new prices, together with costs of transport and installation, commissioning costs and, where appropriate consulting engineers fees (Derry (1979), Mustoe (1960), Brown (op. cit) . Reinstatement claims are made only when the lost or damaged items are actually reinstated.

2.3.2 Indemnity Basis

Where this is contemplated for plant and machinery insurance policies, the valuation must be prepared on the basis of replacing the existing plant with identical or substantially similar items in a condition comparable to that of the existing one. This as observed by Derry (1985) and Brown

(op. cit) is most appropriate where the rebuilding of machinery after loss is not feasible.

2.3.3 Open Market Value for Existing Use Basis

"Existing use value" or "value to the business" as the case may be, is on the assumption that the plant and machinery will continue in its present existing use in the business of the company (Powell (op. cit), Brown (op. cit), SAVP 16 (op. cit), Pearce (1979), Cullingwood (op. cit). Thus, the existing use value of plant and machinery is the price that a purchaser (perhaps a hypothetical purchaser - including the present user) would pay for that plant and machinery to acquire it as part of the business for which it is, at present, being used. SAVP 16(op. cit.), Turner (1977).

An examination of the above definitions reveals that existing use value is an open market concept. This according to SAVP 16 could either be:

a. the net current replacement cost, or

b. the recoverable amount.

The open market value of plant and machinery for existing use is defined in the appendix to SAVP No. 16 (1990) as,

"the best price at which an interest in the plant and machinery might reasonably be expected to be sold at the date of valuation by Private Treaty, Public Auction or Tender, as may be appropriate assuming:

a. a willing seller,

b. a reasonable period within which to negotiate the sale, taking into account the nature of the plant and machinery and the state of the market,

c. values will remain static throughout the period,

d. the plant and machinery will be freely exposed to the market,

e. no account is to be taken of an additional bid by a special purchaser, and

f. the plant and machinery may be valued, either:

i. as a whole in its working place, or

ii. as a whole or as individual items for removal from the premises"

In this context, "existing use" ignores any possibility for alternative use. Thus, according to Ojo (1991) plant and machinery assets as part of a going concern contribute to the profitability of the organisation. And, "goodwill" has been described by Powell (op. cit) as "the profitability of carrying out a business at a certain level of profit". As evident from the above therefore,

SAVP 16 (op. cit) which excludes goodwill from a valuation of plant and machinery for existing use is questionable. Perhaps, it is in apparent recognition of this that it is provided in another section of the SAVP 16 (op. cit) that the net current replacement costs of plant and machinery be subject to adequate potential profitability having regard to the total assets employed. On the basis of this, therefore, we may wish to consider goodwill where plant and machinery assets in public houses, cinemas, bingo clubs, gaming clubs, theatres, specialist restaurants, petrol filling stations, betting shops, and other specialist leisure and sporting facilities are involved (Powell (op. cit), Pearce (1979).

2.3.4 Open Market Value for Alternative Use Basis.

This assumes that the business will be discontinued and, is particularly important in case of company properties (plant and machinery inclusive) that have been declared by the directors as being surplus to trading requirements, like plant and machinery held vacant pending disposal, or as stock or investments or where the plant is either under-utilised or not used at all. It would almost

certainly be inappropriate to adopt an existing use basis of valuation for plant and machinery where land and buildings in which they are housed are valued on an alternative use value basis (Derry (1985), SAVP (op. cit), Cullingwood (op. cit), Merret (op. cit), Ojo (1991)). This is akin to the "net realisable value" or "deprival value" as used in SAVP 16 (op. cit).

The alternative use value or realiable value is thus defined as the best price that is likely to be obtained, within a reasonable period, if the equipment is offered for sale by private treaty, tender or auction (whichever is the most appropriate), but disregarding any additional bid which may be made by a special purchaser, and after making adjustment for selling costs.

2.4 METHODS OF VALUATION

Implicit in the bases of plant and machinery valuation discussed above are the following methods:

i. Replacement or Depreciated Replacement Cost (RC/DRC) Method otherwise, known as Contractor's or Cost method.

ii. Market Comparison approach.

Thus, where the open market value of plant and machinery assets of an ongoing business which is to change hands are to be assessed, the existing use

value based on the DRC must be adopted. But where the open market value of plant and machinery to remain in-situ or items no longer in current production is required (Derry, (1979) and Brown (op. cit) have recommended that either of the DRC or where current market evidence exists, values can be based on current second-hand prices to which an amount must be added to reflect the value of the transport and installation costs.

However, where the assets are to be disposed of in parts, then either of DRC or market evidence of second-hand prices less dismantling and damage costs could be adopted. In addition, for the latter method, the permutations of quantity and nature of assets, time pressures, appropriate sale method and other factors are seemingly endless and the valuer must investigate each case thoroughly (Derry, 1985).

The current replacement cost is defined in the Guidance Notes (1990) of the Royal Institution of Chartered Surveyors as:

> "The cost of replacing an asset with an identical or substantially similar new asset having a similar output or service potentials, including costs of transport, installation, commissioning costs, consultants' fees and non-recoverable sales tax and duties". SAVP 16.

It has however been the view of valuation experts and institutions (Derry (1991), Pearce (1979), Millington (op. cit). Nigerian Institution

of Estate Surveyors and Valuers (NIESV) Guidance Notes (1985), etc. that the DRC is a method of the last resort. In effect, it is applicable to properties (including plant and machinery) which are rarely, if ever, sold except by way of sale of the business as a whole. Examples of this as contained in the Guidance Notes (1985) of NIESV are oil refineries, chemical works, quarries, and limekilns and factories that are no more than cladding to specialist plant and perhaps factories located in a remote area for particular reasons.

In conclusion, we need also to assess the existing use value of the plant and machinery by depreciating it over its remaining economic working life, at least, for financial valuations. The procedure and methods of assessing depreciation will be dealt with later. The net current replacement costs will then be subjected to adequate potential profitability testing, having regard to the total assets employed.

2.4.1 Other Methods

Apart from the above methods, appraisal literature is filled with other equally important methods for assessing the value of proprietary interest in land. These include:

i. Residual technique,

ii. Investment method, and,

iii. Profit/Account method.

(Millington (op. cit), Britton et al. (op. cit), Kinnard (op. cit), etc.)

It may be necessary to know whether any of these methods can be equally applied in plant and machinery valuations. For instance, in residual method, the valuer is only interested in the site value and, would therefore not be appropriate for plant and machinery valuation. Also, since machinery is not kept as an investment as some buildings are (Brown op. cit), then, it is doubtful whether Investment method of valuation for land and buildings could be applicable to plant and machinery valuations.

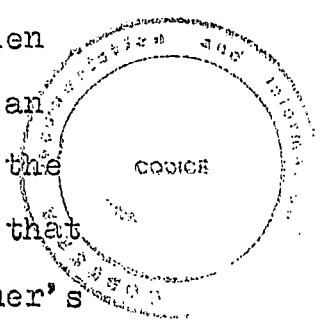
Germane to the above, since the value of a machine is determined by its output, productivity and quality relative to other assets available in the market at a particular time, and place and for a stated purpose (Brown op. cit), it is not impossible to make recourse to profit method for assessing the existing use value of plant and machinery assets in properties having trading potentials. This is particularly important since these properties (plant and machinery inclusive) have element of either factual or legal monopoly

(Millington (op. cit), Powell (op. cit), Desmond and Kelley (1988).

From the foregoing therefore, profit method may be considered appropriate for plant and machinery assets in public houses, cinemas, bingo clubs, gaming clubs, theatres, specialist restaurants, petrol filling stations, betting shops, and other specialist leisure and sporting facilities.

2.5 METHODS OF DEPRECIATING PLANT AND MACHINERY

Derber (1982) and Thayer (1983) have both identified the estimation of depreciation, when undertaking plant and machinery valuation on an existing use basis adopting DRC approach, as the central problem. Derry (1991) concluded that it is the most fundamental aspect of the valuer's art. On this, Armstrong (1903) and Ojo (1984) had earlier maintained that depreciation can only be accurately adjusted for by an engineer who has thorough knowledge of his profession and intimate acquaintance with particular plant and machinery.



In addition to the above, Okoye (1986) despised the current practice of estimating depreciation using mathematical techniques similar to those described by Ring (1965) since,

> "in the absence of market transactions or clearly defined constraints these estimates are of doubtful worth".

Wood et al. (1979), and Woeful (1960) have also identified three other methods of depreciation as the Diminishing (Reducing) Balance, Straight - Line and Residual (Revaluation or Scrap Value) methods. And, according to Woeful (op. cit) computation of depreciation using any of these methods involve consideration of the depreciation base, the estimated life of the assets and scrap (salvage) value of the asset.

Given the different views on the methods of estimating depreciation, three methods appear dominant in the literature. These are:

i. Straight - Line method

ii. Reducing (Diminishing) Balance method

iii. Revaluation (Residual or Scrap) Value method.

2.5.1 Straight - Line Method

The method allocates equal portions of the asset's cost less salvage value to equal amounts in time in the life of the asset. Thus, it assumes that the cost of the asset expires as a steady (straight-line)function of time. The depreciation charge for each year can be computed by the following formula:

$$\text{Depreciation} = \frac{\text{Cost - Salvage value (Residual value)}}{\text{Estimated number of years of service life (expected use).}}$$

2.5.2 Reducing (Diminishing) Balance Method

Under this method, annual depreciation provision for an asset is calculated by applying a fixed percentage to the balance of costs not yet allocated as an expense at the end of the previous accounting period. Therefore, the balance of unallocated costs will continue to decrease each year, and, also with a fixed percentage, the depreciation provision will be less with each passing years.

2.5.3 Revaluation (Residual or Scrap Value) Method.

Here depreciation charge is taken as the difference between the current value of a new item but of a similar nature to the old plant and machinery being valued and the value/cost of the old item.

Depreciation as observed by Derry (1989, 1975, 1991) and Foord (op. cit), is influenced by the following factors:

i. total economic working life of the item in question,

ii. age and remaining economic working life,

iii. condition,

iv. standard of maintenance,

v. degree of use,

vi. workload to which it is subjected,

vii. suitability of the asset for the use to which it is put,

viii. efficiency of plant layout,

ix. condition and suitability of the building,

x. tenure of the building,

xi. degree of technical obsolescence,

xii. replacement of component parts,

xiii. location of the factory and suitability of communications,

xiv. residual value at the end of the economic life, and

xv. any other relevant factors.

The conclusion from the above is that depreciation could either be taken as allocation to cost or a fall in price or decline in value. It is also considered as a function of engineering life. But it should be noted, as discussed above that use is not the only reason affecting depreciation of plant and machinery assets: decay, rust, corrossion and similar agencies make their contribution to physical deterioration. Besides, machine or a plant is composed of many parts having different engineering lifes.

2.6 KNOWLEDGE CONTENT OF PLANT AND MACHINERY VALUATION

A cursory look at the above discussions reveal that plant and machinery valuation require the knowledge of valuation principles and methods, law, economics, technical skills, etc. This is in agreement with the views expressed by Ojo (1990) that, a plant and machinery valuer should:

i. be familiar with the yearly government fiscal policies,

ii. be current with the country's financial trend and stock market performance,

iii. understand production process,

iv. have working knowledge of insurance practices,

v. understand the law of fixtures and fittings,

vi. understand property law within his country of practice, and

vii. be familiar with factory ordinances.

He further added that the above requirements are exclusive of the knowledge of basic valuation principles and methods. In conclusion therefore, Ojo (1984), though a professional engineer and an estate surveyor and valuer in Nigeria, maintained that:

> "Professional engineers per se do not know the basic principles involved in plant valuation, so they are not competent in plant valuation. Besides, plant valuation

> is an integral part of estate management profession and should be practised by estate surveyors and valuers specialist in plant valuation".

This is a tentative view which can only be supported by empirical study, and, it is the subject matter of the following chapters.

CHAPTER THREE

RESULTS AND DISCUSSION

3.0 INTRODUCTION

In the last chapter, the principles, bases, methods and procedure of undertaking plant and machinery valuation by engineering and, estate surveying and valuation firms were established. This chapter therefore sets to empirically study the practice as it obtains in the study area. The procedure adopted is essentially through the collation, analysis and comparative interpretation of the data collected.

3.1 INFORMATION ON THE FIRM

3.1.1. Years of Establishment

From Table 1 below, the survey indicates that 47.1 per cent of the respondent engineering firms were established within the last 10 years whilst 29.4% and 23.5% have been in operation since between (11 - 20) years and above 20 years respectively. The corresponding figures indicate that 35.3 per cent, 47.1 per cent and 17.6 per cent of the respondent firms of estate surveyors and valuers have been in existence since the last (1 - 10) years, (11 - 20) years and above 20 years ago respectively.

Table 1: Years of Establishment

Firms	Engineering		Estate Surveying	
Age (in years)	No	Per cent	No	Per cent
Between 1 - 10	8	47.1	6	35.3
Between 11 - 20	5	29.4	8	47.1
Above 20	4	23.5	3	17.6
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.1.2 Experience in Plant and Machinery Valuation.

On whether both respondent firms have handled plant and machinery valuations before, the figures in Table 2 below reveal that only 11.8 per cent of the respondent engineering firms answered in affirmative whilst the remaining firms (88.2 per cent) signified that they have never undertaken plant and machinery valuation before. On the other hand, all the respondent estate surveying firms answered in the affirmative.

Table 2: Experience in Plant and Machinery Valuation.

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Yes	2	11.8	17	100
No	15	88.2	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992).

3.1.3 Instructions on Plant and Machinery since Establishment.

To further confirm their experience in the field of the subject under consideration, Table 3 below shows that 11.8 per cent, 5.9 per cent, 11.8 per cent and 17.6 per cent of sample firms of engineers gave an indication to have handled between 1 - 5, 6 - 10, 11 - 15 and above 15 instructions respectively on plant and machinery valuations since their establishment. However 52.9 per cent of the engineering firms sampled did not respond as they all claimed not to have received any instruction on plant and machinery valuation before. The figures below revealed that all the sampled firms of estate surveyors and valuers have in one way or the other received instruction(s) on plant and machinery since their establishment. The corresponding figures are 11.8 per cent, 17.6 per cent, 5.9 per cent and 64.7 per cent for

instructions ranging from between 1 - 5, 6 - 10, 11 - 15 and above 15 respectively.

Table 3: No of Instructions on Plant and Machinery

Firms	Engineering		Estate Surveying	
Instructions	No	Per cent	No	Per cent
Between 1 - 5	2	11.8	2	11.8
Between 6 - 10	1	5.9	3	17.6
Between 11 - 15	2	11.8	1	5.9
Above 15	3	17.6	11	64.7
No Response	9	52.9	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.1.4 Types of Instruction

The results as analysed in Table below indicate that 47.1 per cent and 11.8 per cent of the respondent firms of engineers have carried out industrial valuations for technical details and valuation proper respectively. But, 41.1 per cent of the engineering firms did not respond to this question. Of the 11.8 per cent respondent engineering firms that claimed to have undertaken plant and machinery valuation before, it was discovered during the interview that they were confusing valuation with evaluation of projects before construction. On the

other hand, 64.7 per cent and 35.3 per cent of the estate surveying firms sampled for this study have either undertaken only the valuation aspect or both the technical and the valuation details respectively.

Table 4: Type of Instructions

Firms	Engineering		Estate Surveying	
Category	No	Per cent	No	Per cent
i. Technical details	8	47.1	-	-
ii. Valuation proper	2	11.8	6	35.3
iii. (i) and (ii) above	-	-	11	64.7
iv. None of the above	7	41.1	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.2 BASES OF VALUATION

3.2.1 Balance Sheet Purposes

It is observed from Table 5 below that while majority (76.5 per cent) of the sampled firms of estate surveyors and valuers adopt existing use basis for plant and machinery in balance sheet valuations only 17.6 per cent and 5.9 per cent make use of reinstatement and indemnity basis

Table 5: Balance Sheet Valuation

Firms	Engineering		Estate Surveying	
Bases	No	Per cent	No	Per cent
Alternative Use	-	-	-	-
Existing Use	-	-	13	76.5
Reinstatement	2	11.8	3	17.6
Indemnity	-	-	1	5.9
No Response	15	88.2	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

respectively. These firms (76.5 per cent) believed that balance sheet are meant to show only the value of plant and machinery to the business as at a particular date. But, most of the engineering firms interviewed (88.2 per cent) did not respond while the remaining 11.8 per cent of the same sample considered the adoption of reinstatement appropriate for balance sheet purposes. Most of the engineering firms (88.2 per cent) sampled claimed that they only handle technical details and not issues relating to economics or valuation matters. Perhaps the same reason could be adduced to their responses to questions that form Table 6 through 15 below.

3.2.2 Surplus Plants and Machineries Valuation.

The responses in the Table 6 below also reveal an understanding that while 29.4 per cent, 35.3 per cent and 29.4 per cent of the respondent estate surveying firms would adopt alternative use, existing use and reinstatement bases respectively for surplus assets in the balance sheet, the corresponding figures for the above bases of sampled firms of engineers were 5.9 per cent each respectively. Some, particularly estate surveying firms, claimed that it is the letter of instruction that will stipulate the items or assets to be valued and, that, it is not the duty of valuers to consider any surplus asset unless otherwise specifically instructed. The analyses further reveal that 82.3 per cent of engineering firms and 5.9 per cent of estate surveying firms sampled did not respond to this question.

Table 6: Valuation of Surplus Plants and Machineries in the Balance Sheet.

Firms	Engineering		Estate Surveying	
Bases	No	Per cent	No	Per cent
Alternative use	1	5.9	5	29.4
Existing use	1	5.9	6	35.3
Reinstatement	1	5.9	5	29.4
Indemnity	-	-	-	-
No Response	14	82.3	1	5.9
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.2.3 Reporting Alternative Use Value in the Balance Sheet.

On whether alternative use value should be reported in the balance sheet for plant and machinery, it is noted below (Table 7) that majority of the estate surveying firms (52.9 per cent) sampled did not consider it important while about 47.1per cent viewed it as either very or fairly important, important or of some importance. They (47.1 per cent) claimed that if alternative use values are reported for plants and machineries in the balance sheet, then, the directors of industrial concerns could easily detect whether or not they are being gainfully employed in the business. On the other, the few respondent firms of engineers that responded (11.8 per cent) preferred the inclusion of alternative use value in the balance sheet while 88.2 per cent of the same sample did not indicate their preference. Perhaps, the responses of the few engineering firms were based on literal interpretation of the alternative use value.

Table 7: Reporting Alternative Use Value in the Balance Sheet.

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Very Important	1	5.9	5	29.4
Fairly Important	-	-	1	5.9
Important	1	5.9	2	11.8
Of some Importance	-	-	-	-
Not Important	-	-	9	52.9
No Response	15	88.2	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.3 INSURANCE VALUATIONS

As reflected in the Table 8 below with respect to insurance valuation of non-replaceable plant and machinery, 11.8 per cent, 17.6 per cent, 11.8 per cent and 58.8 per cent respectively of sampled estate surveying firms would adopt alternative use, existing use, reinstatement and indemnity bases respectively. While only 11.8 per cent of engineering firms preferred existing use basis . Majority (88.2 per cent) of the same sample of respondent firms did not respond.

Table 8: Bases of Valuation for Non-Replaceable Plant and Machinery

Firms	Engineering		Estate Surveying	
Bases	No	Per cent	No	Per cent
Alternative Use	-	-	2	11.8
Existing Use	2	11.8	3	17.6
Reinstatement	-	-	2	11.8
Indemnity	-	-	10	58.8
No Response	15	88.2	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992).

3.4 GOODWILL VALUATION

3.4.1 Goodwill and Existing Use Basis

It is noted in the Table 9 below that majority of estate surveying firms sampled (70.6 per cent) do not normally consider goodwill of plant and machinery of industrial concerns for valuations on existing use basis while only few (29.4 per cent) answered in affirmative. They (70.6 per cent) claimed that apart from being a matter of convention, goodwill is not easy to identify and, that it is not always stated in most instructions given by their clients. Also, most of the respondent engineering firms did not respond while 5.9 per cent of the same sample considered goodwill for valuations on existing

use basis important. The reason(s) for this disserting view or opinion is not known.

Table 9: Consideration of Goodwill for Valuation on Existing Use Basis

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Yes	1	5.9	5	29.4
No	-	-	12	70.6
No Response	16	94.1	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.4.2 Goodwill and Properties Having Trading Potential

Table 10 below is a replica of table 9 as the same percentage (70.6 per cent) of respondent estate surveying firms maintained that goodwill should not be taken into account for even plant and machinery in properties subject to trading potentials while only 29.4 per cent of the same sample considered it necessary. In addition, the same table also indicates that 94.1 per cent of the engineering firms studied did not respond while 5.9 per cent considered it appropriate and important.

Table 10: Consideration of Goodwill for Plant and Machinery in Properties Having Trading Potential.

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Yes	1	5.9	5	29.4
No	-	-	12	70.6
Indifferent	-	-	-	-
No Response	16	94.1	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.5 METHODS OF VALUATION

3.5.1 Method Mostly Employed in Practice

It is realised from Table 11 below that all (100 per cent) the respondent estate surveying firms adopt cost method for plant and machinery valuations while a significant few of the engineering firms sampled (29.4 per cent) adopt this same method. Most of these engineering firms (29.4 per cent) claimed to adopt this approach for cost evaluation (estimation) of engineering projects. However, majority of the engineering firms (70.6 per cent) interviewed did not respond.

Table 11: Method Mostly Employed in Practice

Firms	Engineering		Estate Surveying	
Methods	No	Per cent	No	Per cent
Comparison	-	-	-	-
Cost (DRC/RC)	5	29.4	17	100
Profit/Account	-	-	-	-
None of the above	-	-	-	-
No Response	12	70.6	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.5.2 Company's Profit and Plant/ Machinery Value.

On whether recourse are normally being made to the level of company's profit in plant and machinery valuations, the Table 12 below shows that only 17.6 per cent of the estate surveying firms sampled answered in affirmative while the remaining 82.4 per cent of the estate surveying firms and 29.4 per cent of engineering firms interviewed considered it unnecessary. They, particularly estate surveying firms, claimed that directors are always unwilling to disclose the actual state of their businesses or, at best, fraudulent accounts may be disclosed. It is also noted in the same table below that 70.6 per cent of the respondent engineering firms did not respond.

Table 12: Effect of Company's Profit on Plant and Machinery Value

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Yes	-	-	3	17.6
No	5	29.4	14	82.4
Indifferent	-	-	-	-
No Response	12	70.6	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.5.3 Valuation of Plants and Machineries Having Trading Potential.

For plants and machineries in properties subject to trading potentials it is observed in Table 13 below that 88.2 per cent and 29.4 per cent of respondent firms of estate surveyors and valuers, and engineers respectively adopt cost method of valuation whilst the remaining 11.8 per cent of estate surveying firms preferred profit approach. The reasons for adopting cost approach being, particularly from the point of view of estate surveying firms sampled, that the actual state of the business or account may not be disclosed coupled with the specialised nature of the valuation. 70.6 per cent of the sample of engineering firms did not respond. This may perhaps be interpreted to mean that they are not familiar with this type of valuation.

Table 13: Methods of Valuation for Plant and Machinery in Properties Having Trading Potential.

Firms	Engineering		Estate Surveying	
Methods	No	Per cent	No	Per cent
Comparison	-	-	-	-
Cost (DRC/RC)	5	29.4	15	88.2
Profit/Account	-	-	2	11.8
None of the above	-	-	-	-
No Response	12	70.6	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.5.4 Method of Valuing Surplus Plants and Machineries

The Table 14 below also indicates, that 82.3 per cent and 11.8 per cent of estate surveying and engineering firms sampled respectively would adopt cost method even where plants and machineries that are surplus to company's requirements are to be valued. They, particularly estate surveying firms, claimed that accounts prepared by accountants in Nigeria are not reliable or that the directors may refuse to disclose the true position of their businesses. Of the engineering firms sampled 88.2 per cent did not respond while 5.9 per cent and 11.8 per cent of the remaining estate surveying

firms preferred comparison approach and profit method respectively.

Table 14: Method of Valuing Surplus Plants and Machineries

Firms	Engineering		Estate Surveying	
Methods	No	Per cent	No	Per cent
Comparison	-	-	1	5.9
Cost (DRC/RC)	2	11.8	14	82.3
Profit/Amount	-	-	2	11.8
None of the above	-	-	-	-
No Response	15	88.2	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.5.5 Valuation of Moveable Plant and Machinery

Table 15 below indicates that 88.2 per cent and 5.9 per cent of sampled estate surveying and engineering firms respectively do take into account moveable plants and machineries like motor vehicles, cranes, etc., for industrial valuations purposes while the remaining (11.8 per cent sample of estate surveying firms considered it unnecessary. However, 94.1 per cent of the engineering firms sampled did not respond.

Table 15: Valuation of Moveable Plant and Machinery

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Ber cent
Yes	1	5.9	15	88.2
No	-	-	2	11.8
No Response	16	94.1	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.6 METHODS OF DEPRECIATING PLANT AND MACHINERY

3.6.1 Depreciation Method Mostly Employed in Practice.

Table 16 below shows that most estate surveying firms (70.6 per cent) and engineering firms (76.5 per cent) sampled adopt straight-line method of depreciation in practice. 17.6 per cent and 5.9 per cent of the sample of estate surveying and engineering firms respectively preferred Diminishing Balance method while the corresponding figures for scrap value are 5.9 per cent and 17.6 per cent respectively. The table further reveals that only 5.9 per cent of the sample firms of estate surveyors and valuers adopt Sinking Fund method.

Table 16: Method Mostly Employed in Practice

Firms	Engineering		Estate Surveying	
Methods	No	Per cent	No	Per cent
Straight Line	13	76.5	12	70.6
Diminishing Balance	1	5.9	3	17.6
Scrap Value	3	17.6	1	5.9
Sinking Fund	-	-	1	5.9
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.6.2 Procedure of Adjusting for Depreciation

In adjusting for depreciation, Table 17 indicates that some engineering firms (58.8 per cent) and most estate surveying firms (76.5 per cent) sampled carry out this in the office while 41.2 per cent and 23.5 per cent of the respondent engineering and estate surveying firms respectively considered it not appropriate.

Table 17: Office Adjustment for Depreciation

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Yes	10	58.8	13	76.5
No	7	41.2	4	23.5
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.6.3 Field Adjustment for Depreciation

In a related question to the one analysed in Table 17 above, but on the importance of 'on-the-spot' assessment of depreciation during inspection, Table 18 below shows that all the respondent engineering and estate surveying firms considered it either very important, fairly important or important.

Table 18: Field Adjustment for Depreciation

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Very Important	12	70.6	10	58.8
Fairly Important	3	17.6	4	23.5
Important	2	11.8	3	17.7
Of some Importance	-	-	-	-
Not Important	-	-	-	-
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.6.4 Group Depreciation of Similar Plants

It is noted in Table 19 below that majority of engineering (98.2 per cent) and estate surveying (88.8 per cent) firms sampled did not favour grouping of similar plants and machineries

together for depreciation. Their reasons being that similar items may be subjected to different intensity of use and maintenance. However, some (41.2 per cent) of estate surveying firms sampled and few (11.8 per cent of the respondent firms of engineers considered it appropriate.

Table 19: Group Depreciation of Similar Plants

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Yes	2	11.8	7	41.2
No	15	88.2	10	58.8
Total	17	100	17	100

Source: Field Data Analysis (1992)

3.7 INVENTORY AND SCHEDULE COMPILATION

On inventory and schedule compilation, while in Table 20 below 41.2 per cent of the respondent estate surveying firms considered the employment of specialist (engineers) not important others viewed it as either very important (29.4 per cent) or of some importance (29.4 per cent). However, the engineering firms sampled consider it either very important (70.6 per cent) or important (29.4 per cent). Those estate surveying firms

that considered it as either very important or of some importance claimed that specialists are only needed for specialised plants while those who answered to the contrary (41.2 per cent) believed that even for specialised industrial valuation it is the production process that matters and not the technical details.

Table 20: Employment of Specialist

Firms	Engineering		Estate Surveying	
Options	No	Per cent	No	Per cent
Very Important	12	70.6	5	29.4
Fairly Important	-	-	-	-
Important	5	29.4	-	-
Of Some Importance	-	-	5	29.4
Not Important	-	-	7	41.2
Total	17	100	17	100

Source: Field Data Analysis (1992)

CHAPTER FOUR

SUMMARY AND POLICY IMPLICATION OF FINDINGS

4.0 INTRODUCTION

The data that constitute the empirical base of this study were collated and analysed in the previous chapter.

This chapter therefore focuses on the summary of the observations as deduced from the analyses and their implications for plant and machinery valuation practice.

4.1 SUMMARY OF FINDINGS

4.1.1 Information on the Firm

The empirical study indicates that estate surveying firms sampled received more instructions on plant and machinery valuations than the respondent engineering firms. However, while all the estate surveying firms studied have since their establishments, in one way or the other, handled plant and machinery valuation before, only few respondent engineering firms could claim same. Thus, from the survey, estate surveying firms are more involved in plant and machinery valuations than the engineering firms in the study area.

It is also recognised in the study that while most of the respondent firms of estate surveyors and valuers engage in actual valuation of plant and machinery, few of the engineering firms studied that do receive instructions on same undertake only technical details.

4.1.2 Bases of Valuation

4.1.2.1 Balance Sheet Purposes

It is observed that while majority of the estate surveying firms sampled adopt existing use basis for plant and machinery for balance sheet purposes, most engineering firms surveyed did not respond as they claimed to handle only technical matters and not economic issues. The few other estate surveying and engineering firms that responded do employ reinstatement and indemnity bases for balance sheet purposes.

In addition, most estate surveying firms would prefer either existing use or reinstatement bases for surplus plant and machinery in the balance sheet rather than adopting the alternative use basis. Majority of the estate surveying firms sampled considered it unnecessary whilst others saw it as either very or fairly important or important. Perhaps, the few responses from the firms of engineers studied were based on literal

interpretations of the checklist of bases provided as they were not consistent in their opinions.

4.1.2.2 Insurance Valuations

It is obtained from the study that most respondent estate surveying firms would adopt indemnity basis for non-replaceable plant and machinery while others considered either alternative use or existing use or reinstatement basis appropriate. The few engineering firms that responded preferred existing use basis.

4.1.2.3 Goodwill Valuation

The study further ascertained that only few of the respondent estate surveying firms considered goodwill of plant and machinery for valuations on existing use basis. The others claimed it is difficult to identify or that most instructions fail to specify whether it should be included or not. Apart from this, most of the same respondent firms still insist that goodwill should not be taken into account when assessing the value of plant and machinery in properties having trading potentials.

4.1.4 Methods of Valuation

The conclusions from the analyses indicate that cost method is mostly employed in practice for plant and machinery valuations by all the respondent estate surveying firms; even, where plant and machinery in properties having trading potentials or surplus plants and machineries are to be assessed. In carrying out these valuations, they (estate surverying firms) do not consider the level of the company's profit as reflected in Trading, Profit and Loss Account. The few engineering firms that responded preferred cost method but their responses were more in line with evaluation than valuation. The survey further revealed that majority of the respondent estate surveying firms still assess moveable plants and machineries as part of the estates in land whilst only few engineering firms studied engage in this.

4.1.5 Methods of Depreciating Plant and Machinery

4.1.5.1 Method/Adjustment of Depreciation

The survey indicates that the commonest method of depreciation among all the respondent firms is the straight-Line method whilst only few adopt Diminishing balance and scrap value methods in practice. It is also recognised from the survey

that most depreciation adjustments are carried out in the office by the respondent firms. However, all the respondent engineering and estate surveying firms recognised the importance of "on-the-spot" assessment of depreciation for plant and machinery valuations. The survey further reveals that while both respondent firms do not favour grouping of similar plants and machineries together for depreciation purposes some estate surveying firms sampled have been adopting it in practice.

4.1.5.2 Inventory and Schedule Compilation.

It is noted in the study that while most engineering firms interviewed considered the employment of specialist for referencing important, almost half of the sampled firms of estate surveyors and valuers viewed it as unimportant.

4.2 POLICY IMPLICATION OF FINDINGS

Plant and machinery valuation being a specialised branch of valuation fraternity is confirmed above to have two sides: technical condition and economic details. Although the conclusions above have shown further that it has been the exclusive preserve of the estate surveying firms in the study area, the study also reveals the contributions of

the engineering firms which cannot be ignored. Therefore, we examine here some of the pitfalls of the current practice of plant and machinery valuations in the study area.

4.2.1 Bases of Valuation

4.2.1.1 Balance Sheet Purposes

Although existing use values of plants and machineries indicate their true worth to the enterprise, at least, for the foreseeable future, it is reasonable to assume that any trading company should be able to justify the cost or value of those assets in its operations. In this context, "existing use" ignores any possibility of alternative. The justification has always been that since normal accounting concepts assume an on-going business, then, any possibility of alternative use values for plants and machineries are not suitable for inclusion in the accounts. It is further added that balance sheets prepared by accountants are expected to show the state of the business at a certain date to a particular investor, and, that this desire has led to the requirements of objectivity and conservatism.

The validity of the above, however, in revealing the true financial position of a business is reviewed below.

4.2.1.1.1 Bankruptcy

This may arise where the value of the plant and machinery in the open market is worth only a fraction of the costs reflected in their balance sheet, especially, in a depressed economy. Thus from the above, corporations with prosperous - looking balance sheets may be slapped into bankruptcy when there is no slightest chance of renewing mortgages in the shattered real estate market.

4.2.1.1.2 Over-Valuation

Valuers, in a depressed economy, also hardly help knowing that by adopting existing use basis for plant and machinery assets in the balance sheet, they may be over-valuing them from the standpoint of what obtains for comparable items in the open market.

4.2.1.1.3 Fraud

It may also occur that the plant and machinery assets have acquired more value due to economic boom and contrary to what they are worth to the business owner, while this fact has been concealed from the shareholders because they are exhibited in the balance sheet only at their existing use values. As a result, insiders cognizant of the facts misrepresented upon the balance sheet may dispose off these assets at nominal costs by

auction sales to their friends or relations when their values are to be written off.

4.2.1.1.4 Importance of Alternative Use Value

Apart from the above, assessing the alternative use value of plant and machinery in the balance sheet is important for the following reasons:

i. It is the minimum value of the plant and machinery; and, thus, a seller would be irrational to sell at a lower figure;

ii. It also indicates their (plants and machineries) possible salvage value when they are to be disposed of;

iii. It also helps to inform the share-holders and the directors of a company whether the plants and machineries are being gainfully employed in their existing or present use; and,

iv. Finally, the alternative use value gives the minimum liquidity available to the owner, subject again to the size of any losses incurred after the investment is made.

It is valuation heresy to adopt reinstatement and indemnity bases for plant and machinery in the balance sheet. This is because balance sheet is only to show the state of the business to a particular investor as of certain date and not the

cost of indemnifying or reinstating the plant and machinery in case of hazards. Thus the adoption of these bases in practice by all respondent engineering firms and significant few of firms of estate surveyors and valuers only expose their deficiencies in this area.

4.2.1.2 Bases for Surplus Plants and Machineries Valuation

While it may not be correct to reflect surplus plants and machineries that could be disposed of in the open market at their existing use values in the balance sheet, it may be reasonable where valuers cannot differentiate between surplus assets and those being employed for the purpose of the business; or, where the instructions from the client have indicated assets to be valued. Much as valuers would want to hide under these reasons, it is important that possibility of higher alternative use values for such assets be considered. For instance, it might be better to liquidate the company and realise the value of the asset of which plant and machinery becomes part of, or, even without liquidating the company, the surplus plants and machineries may be gainfully employed elsewhere rather than being redundant in the present use.

The above expositions therefore reveal the possibility of undervaluation, misinformation, or wrongful advice where the estate surveying firms are allowed to continue to value surplus plants and machineries for balance sheet purposes on an existing use basis.

4.2.1.3 Insurance Valuations

The adoption of reinstatement basis for non-replaceable plant and machinery may over compensate the insured in case of any hazard thus defeating the essence of any insurance cover. Therefore, plant and machinery that could not be replaced can only be insured considering their present condition or state. In addition, it is a misnomer to adopt alternative or existing use basis for insurance valuations as is being done presently by some estate surveying firms sampled and, the few engineering firms that responded. Alternative or existing use value will not reflect the cost of putting the insured back to his original position before the incident.

4.2.2 Goodwill Valuation

Although, it may be true that goodwill is not easy to indentify or that most instructions on plant and machinery valuation have failed to specify whether it is to be considered, it should

be noted that for plants and machineries in properties having trading potentials to reflect their true worth, this has to be assessed. The reason being that the values of such assets depend on the relative level or volume of business. Thus, the values of plants and machineries employed in such businesses, as hotels, filling stations, etc. depend on the situation or location, name or reputation and, or, profitability of the enterprise. And, goodwill is defined as the probability of carrying out a business at a certain level of profit.

4.2.3 Methods of Valuation

The adoption of the DRC basis for plant and machinery valuations in the study area may seem to be in order where the assets are rarely, if ever, sold except by way of sale of the business as whole. But, we have always recognised that "cost" is not necessarily "value". Germane to this, we may wish to note that plant and machinery assets are employed in a business concern not for their own sake but for what they contribute to the profitability of the operational entity; and, that assets having trading potentials, e.g. hotels, filling stations etc. are bought and sold as fully operational businesses. Thus, valuation of plant and machinery in properties having

trading potentials or surplus assets or plants ordinarily employed in any business concern include something more than the physical element. Therefore the adoption of DRC in practice may fail to reflect their true worth.

4.2.4 Methods of Depreciation

4.2.4.1 Straight-Line and Diminishing Balance Methods/Group Depreciation

There is little doubt that engineers and estate surveyors and valuers in the study area, in assessing depreciation using either straight-line or Diminishing Balance method in relation to plant and machinery, are attempting some physical phenomenon. This is based on the premise that at a certain stage of its existence an asset can no longer be effectively used for the purpose for which it was acquired. And, it is often assumed that by measuring the "use" of an asset we are measuring the extent of its being "used up". It is submitted that these two factors are not necessarily identical. This is because, it is of course, well recognised that use is not the only reason behind the "using up" of assets; decay, rust, corrosion and similar agencies make their contribution to physical deterioration. Even, similar plants and machineries do not depreciate at the same rate.

Another, perhaps related, point is that many physical assets (e.g. plant and machinery) are composed of parts which can be replaced when worn out or needing repair, sometimes to such an extent that over a period practically no part of the original object is functioning in the existing "asset". In the light of such information, what is meant by saying that the rate of depreciation of a plant or machinery is, say, 20 per cent annum? or when we say that a machine is likely to last, say, five years, do we mean that it is a piece of equipment composed of parts, none of which lasts more than five years? Or do we mean that it is a piece of equipment, of which a majority of the component parts will last five years? And, in this case, what constitutes "a majority", or, "the principal functioning parts"? Or do we mean that it is a piece of equipment composed of parts, each or most of which lasts an average of five years?

On the basis of these arguments, the use of straight-line and diminishing balance methods or the charging or grouping of similar plants and machineries for the same depreciation rate may create problems for valuation purposes.

4.2.4.2 Field Versus Office Adjustments for Depreciation.

It should be noted that where a complex manufacturing concern involving too many details is to be assessed, the valuer may lose sight of certain factors after inspection of adjustments are made in the office. Perhaps, it is in recognision of this fact that compels both respondent firms to recognise on-the-spot assessment of depreciation of plant and machinery.

4.2.5 Inventory and Schedule Compilation

The study reveals that plant and machinery valuations include both economic and technical details. But we have also recognised that "cost" is not necessarily "value" and, that "technical details" is just a fractional part of plant and machinery valuations. On this note therefore, we may conclude that plant and machinery engineering is quite distinct from plant and machinery valuation. However, this does not preclude us from agreeing that the practice is not without its own pitfalls - which have hitherto been examined in detail above.

But, we may also wish to recognise that for plant and machinery valuation to be comprehensively carried out, there is the need to be

familiar with its workings or conditions for a very long time. This is because of the technicalities involved and, the need to exercise great care as the information supplied by the present user of the plant and machinery may not reveal its defficiencies. In addition, the plant and machinery may be very good but suffering from bad usage. This therefore requires the expertise of engineers to evaluate the condition of plant and machinery for valuation purposes.

The foregoing arguments cannot however make engineers to be plant and machinery valuers. They are only partners in progress to estate surveyors and valuers in the determination of "value" which is the end product of plant and machinery valuation. Anything other than this would mean that a building surveyor can claim to be valuer of buildings;, or, resort to be situation where land surveyors and lawyers will be standing as valuers of bare sites or lands; or, a surgeon may be seen advocating in law courts in cases relating to surgical operations; and, or, more appropriately, estate surveyors and valuers claiming to be advocate and not expert witness in any valuation and land matters in our Lands tribunal or law courts.

CHAPTER FIVE

RECOMMENDATIONS AND CONCLUSIONS

5.0 INTRODUCTION

Arising from the last chapter above, we put forth here below a number of recommendations that we believe if carried out could help resolve problematic areas highlighted earlier in chapter 4 in plant and machinery valuation. The recommendations will in addition, also improve the current state of art of plant and machinery valuation in the study area for codification of good practice.

5.1 RECOMMENDATIONS

5.1.1 Adoption of Alternative use Value

Alternative use value of plant and machinery should be reported by the valuer where it exceeds existing use value for incorporation into the balance sheet; and, this must conform to the definition of open market value. This situation will help to inform the directors whether or not the plants and machineries are gainfully employed in the business.

Where the plants and machineries are at present surplus to company's requirements, it is also important that their alternative use values be incorporated in the accounts. In addition, on no account

must the current practice of adopting reinstatement and indemnity bases for plant and machinery valuation for balance sheet purposes be allowed to continue.

5.1.2 Indemnity Bases

It is recommended that indemnity bases be adopted for plants and machineries that are non-replaceable in their present states and conditions. They may therefore be valued by comparison with equivalent assets from another sources.

5.1.3 Goodwill Valuation

Any value attributable to goodwill in case of plants and machineries in properties having trading potentials should be taken into consideration. The DRC may not necessarily reflect the actual worth of these assets because for instance, their valuations e.g. hotels include more than the property element. Therefore profit method of valuation of this concern as a whole is recommended (where goodwill is already included).

5.1.4 The Need for Profitability Testing

Bearing in mind that plants and machineries are not employed for their own sake but for they contribute to the level of profit or business for

an industrial concern, then we recommend that the DRC figure should always be expressed as subject to the adequate potential profitability of the business having regard to the total value of the assets employed.

5.1.5 Depreciation Methods/Adjustment

Arising from the implications of adopting either straight-line or diminishing balance method given above, scrap (revaluation) value method is recommended for plant and machinery valuations. This is important, particularly, where plants and machineries are to be re-examined and revalued at stated intervals to discover how much loss has been sustained on them. This therefore takes depreciation as fall in value unlike earlier methods that considers it as fall in price, as physical deterioration or as allocation of cost. Reliance should however be placed on the expertise of engineers for the purpose of determining depreciation rate.

As much as possible, valuers should adopt "on-the-spot" assessment of depreciation and not office adjustment after field inspection as the next best alternative.

5.1.6 General Recommendations

Estate surveying and valuation firms in the study area should continue to undertake plant and machinery valuations. However, in the interim, in order to compensate for their technical deficiencies engineering firms should be employed to give the condition report of the items involved. In addition, the Nigerian Institution of Estate Surveyors and Valuers in conjunction with the Estate Surveyors and Valuers Registration Board of Nigeria, should organise symposia, workshops etc. to further broaden their knowledge and remove the existing cobwebs in their current practice of plant and machinery valuation.

As a lasting or permanent solution, the Nigerian Institution of Estate Surveyors and Valuers should create a specialisation within their general practice for the training of specialist plant and machinery valuers. Admission to this professional programme should, however, be open to engineers and professionals or graduates of other cognate or non-cognate disciplines that may be technically minded. Perhaps, in conclusion, the same appeal may have to go to all institutions of higher learning offering estate management to incorporate courses that are relevant for plant and machinery valuations into their academic curricula. The professional institution may also

wish to set up plant and machinery valuation standards committee to formulate standards to guide plant valuers.

5.2 CONCLUSIONS

5.2.1 Summary

The study has revealed a number of concepts, bases and methods of plant and machinery valuation. It is also recognised in the study that estate surveying firms enjoy a lot of patronage and, are more involved in plant and machinery valuations than engineering firms. However, since industrial valuations include both economic and technical details, the contributions of engineering firms in the area of depreciation assessment cannot be over-emphasised. We have also noted the pitfalls of the current practice of plant and machinery valuations in the study area. Thus, it is hoped that if the above recommendations are considered and implemented, almost every one of the many controversial points of, who a plant valuer is, or, concerning the proper way of assessing the plant and machinery value would be resolved. It would therefore ensure codification of good practice, provide guidance to estate surveying and engineering firms, and promote standardisation of approach to the users of valuations.

5.2.2 Areas for Further Research

Finally, we wish to acknowledge the fact that the study may not necessarily be conclusive enough for there is the need to examine, amongst other things, the semblance of academic and professional content of estate surveying and valuation and engineering to the knowledge content of plant and machinery valuation. Other areas for further research include the possibility of adopting profit method of valuation for plant and machinery assets on a going concern, the issue of depreciation provision and, the nature of presentation of valuation report for plants and machineries. These may however have to be done in addition to some other critical issues already raised in this study.

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APPENDIX

QUESTIONNAIRE ON AN EMPIRICAL STUDY OF PLANT AND MACHINERY VALUATION TECHNIQUES IN NIGERIA.

Dear Sir,

This questionnaire is designed to elicit your views on plant and machinery valuation techniques in Nigeria. The questionnaire is purely for academic purpose. Any information given shall be treated as strictly confidential and will in no way jeopardize the interest of the informant.

Your co-operation will be highly appreciated.
Thank you.

Yours faithfully,

B.T. Aluko
Dept. of Estate Management
Obafemi Awolowo University,
Ile-Ife, 1991/92 Session.

N.B: Tick the appropriate box(es) in each of the questions below:

SECTION A

INFORMATION ON THE FIRM

1. Firm ( ) Engineers
   ( ) Estate Surveyors and Valuers

2. No. of years of establishment
   i. 1 - 10 ( )
   ii. 11 - 20 ( )
   iii. Above 20 ( )

3. Has your firm handled plant and machinery valuations before?
   Yes ( ) No ( )

4. Since your establishment, how many instructions on plant and machinery have you received?
   i. Between 1 - 5 instructions ( )
   ii. Between 6 - 10 " ( )
   iii. " 11 - 15 " ( )
   iv. Above 15 instruction ( )

5. In what category?
   i. Technical condition report/Production ( )
   ii. Valuation proper ( )
   iii. (i) and (ii) above ( )
   iv. None of the above ( )
   v. Others (please specify ( )

SECTION B

BASES AND METHODS OF VALUATION

6. Which of the following bases do you normally consider for balance sheet purposes?
   i. Alternative use ( )
   ii. Existing use ( )
   iii. Reinstatement ( )
   iv. Indemnity ( )

7. For plant and machinery surplus to company's requirements (industrial concern) which of these following bases would you adopt?
   i. Alternative use value ( ) ii. Existing use ( )
   iii. Reinstatement ( ) iv. Indemnity ( )

8. How would you consider the idea of reporting possible alternative higher values for plants and machineries to be included in the balance sheet?

i. Very important ( ) ii. Fairly important( )
iii. Important ( ) iv. Of some important ( )
v. Not important ( )

9. Which of the following bases would you adopt for insurance purposes where the plant and machinery assets are not replaceable?

i. Alternative use ( ) ii. Existing use ( )
iii. Reinstatement ( ) iv. Indemnity ( )

10. Do you normally consider goodwill as part of plant and machinery values for a business on a going concern or existing use basis?

Yes ( ) No ( )

11. Will your opinion differ for items of plant and machinery in properties having trading potential (e.g. petrol filling stations, gaming clubs etc.)

Yes ( ) No ( )

12. Which of the following methods of plant and machinery valuation do you employ most in practice?

i. Comparison Approach ( )
ii. Cost (DRC/Replacement Cost) Approach ( )
iii. Profit/Account Method ( )
iv. None of the above ( )
v. Others (please specify) ( )

13. Im adopting any of the above methods, do you normally make recourse to the level of the business or company's profit for plant and machinery valuations?

Yes ( ) No ( )

14. Which of the following methods do you normally employ for plants and machinery in properties having trading potential (e.g. petrol filling stations, gaming or Casino clubs, bingo etc.)?

i. Comparison Approach ( )
ii. Cost (DRC/Replacement Cost) Approach ( )
iii. Profit/Account Method ( )
iv. None of the above ( )

15. Which of the above methods would you adopt for items of plants and machinery surplies to company's requirements?

i.	Comparison Approach	( )
ii.	Cost (DRC/RC) Approach	( )
iii.	Profit/Account Method	( )
iv.	None of the above	( )
v.	Other (please specify)	( )

16. Do you normally take into account movable plants (e.g. motor vehicles, crane, etc) as part of the plant and machinery assets forming part of an estate in land?

Yes ( ) No ( )

SECTION C

METHODS OF DEPRECIATING PLANT AND MACHINERY

17. Which of the following methods do you employ most in practice?

i.	Straight line	( )
ii.	Diminishing Balance	( )
iii.	Scrap Value	( )
iv.	Sum-of-Digit	( )
v.	Sinking Fund	( )
vi.	Others (please specify)	( )

18. Do you normally adjust for the depreciation in the office after field inspection?

Yes ( ) No ( )

19. How would you consider "on-the-spot" assessment of the depreciation for plant and machinery assets during the period of inspection?

i.	Very important	( )
ii.	Fairly important	( )
iii.	Important	( )
iv.	Of some importance	( )
v.	Not important	( )

20. Are similar plants and machineries grouped together and charged with the same rate for depreciation purposes?

Yes ( ) No ( )

21. How would you rank the employment of specialist in referencing (inventory and schedule compilation) for plant and machinery valuation purposes?

i. Very important ( )
ii. Fairly important ( )
iii. Important ( )
iv. Of some important ( )
v. Not important ( )