

**A CRITICAL EVALUATION OF PLANT AND  
MACHINERY VALUATION APPROACHES IN  
KENYA**

**BY**

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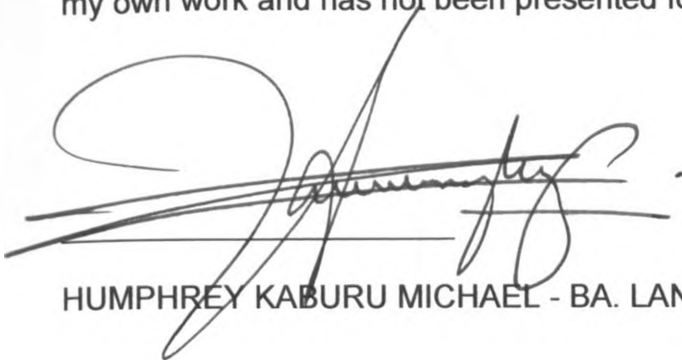
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## DECLARATION

I, HUMPHREY KABURU MICHAEL, hereby declare that this research project is my own work and has not been presented for a degree in any other university.

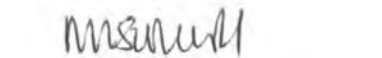


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Date: 15<sup>TH</sup> Sep. 2009.

## DECLARATION BY SUPERVISOR

This research project has been submitted for examination with my approval as a University Supervisor.



DR. MOHAMMED A. SWAZURI

Date: 16/09/2009

## DEDICATION

This work is dedicated to wife Beth and daughter Sharon.

## ACKNOWLEDGEMENTS

It is difficult to mention in details the contribution of each of all who have directly or indirectly helped. However, particular thanks and acknowledgements are due to the following persons and organizations without whom it would have been possible to complete this project.

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## ABSTRACT

Plant and machinery valuation is a multi-disciplinary subject involving law, engineering, statistics, economics, insurance, industrial process, environment and planning. In addition, it is a complex process which requires multi-disciplinary approach. In setting up of any project or economic activity whose key objective is adding value, the basic starting point is valuation of plant and machinery.

The manner in which the exercise has been handled in this country is wanting. There is lack of clarity on who should really handle plant and machinery valuations and even more importantly on what areas should plant and machinery valuers be trained. The players in this exercise have been valuers with real estate training background, engineers with mechanical training and engineers trained in plant and valuation appraisal in addition to their background. The study evaluates the current practice on how plant and machinery valuation is undertaken and critically discusses the approaches applied together with their challenges and concludes by case studies as an illustration on how plant and machinery valuation is undertaken.

This thesis has looked into how the exercise is conducted, the approaches applicable through literature review, primary data has been collected on valuation services providers (valuers and engineers and others), valuation services consumers (banks, insurance companies, Kenya Revenue Authority) and second hand international machine dealers touching on all aspects of plant and machinery valuation.

Further to the above reasons, there was need to explore the training aspects and co-working of experts to enhance the values frequently returned. Through review of related literature, and interview with many informants it has been found that 90% of the valuation firms in Kenya have been outsourcing plant and machinery valuation assignments to engineers.



Plant and machinery valuation is not a straightforward exercise and the problem is basically not lack of sufficient market data but insufficient knowledge on where to obtain relevant information, improper valuation team cognition and the training approach for valuers with real estate background. Further to this, the study revealed lack of training at the undergraduate level and insufficient training at masters level on plant and machinery valuation at the University of Nairobi.

From the training point of view, the study favours the re-development of curriculum to encompass the introduction of plant and machinery valuation to valuers with real estate training background and to be consulting the services of registered engineers trained in plant and machinery valuation in addition to their with mechanical engineering background for complex valuation assignments. This will enhance the quality of valuation and more importantly a more justifiable value opinion will be achieved.

## CHAPTER ONE

### INTRODUCTION AND PROBLEM STATEMENT

#### 1.0 General Introduction

'Plant and Machinery' refers to 'installations and support facilities to manufacturing in an industry designed to perform a specific predetermined function, whether used singly or in combination with other items to enhance the productivity or operating facility; and includes all devices in fixed or movable form, other than real estate, deployed in manufacturing, processing or assembling of products from the stage of raw materials to finished goods (Budhbatti, 1999). In a heavy engineering industry, plant and machinery would refer to machine tools & equipment and other support facilities installed/used for production, maintenance, services, material handling, testing, inspection and other support functions etc.

The valuation of plant and machinery is a complex process, as it pertains to wide spectrum of equipment with its own inherent characteristics and functions. Its value would depend on many factors which are unique to each machine. Amongst the issues to be considered in the valuation of plant and machinery are the specific utility or usefulness of the asset, its contribution to the production of goods and services for which it was designed and deployed for and its potential to produce and contribute to the profitability of the business (Alico, 1989).

Plant and machinery valuation is concerned with determining the monetary worth or value of plant and machinery for a particular purpose and at a particular point in time (Syagga, 1994). The terms "Plant" and "machinery" are used to refer to installations and support facilities for manufacturing in an industry designed to perform a specific pre-determined function, whether used singly or in combination with other items to enhance the productivity or operating facility. They include all devices in fixed or movable form, other than real estate, deployed in manufacturing, processing or assembling of products from the stage of raw materials to finished goods (Budhbhatti, 1999).

Valuation of plant and machinery is very complex in nature as it involves industries of wide spectrum each having plant and machinery with its own inherent characteristics. Among the issues to be considered in the valuation of plant and machinery are the specific utility or usefulness of the asset, its contribution to the production of goods and services for which it is designed and deployed (Agabian, 1989). The valuation covers estimation in monetary terms the worth of the plant and machinery in existing use or their contribution to the profitability of the business after considering the market situation or standard of maintenance (Alico, 1989).

Before any appraisal can have any meaning in content or significance in result it must have a purpose. The purpose is essential to establish the report asset content, the limiting conditions or any other parameter which will lead to a proper value analysis (Graham, 1989).

The valuation of plant and machinery involves three basic approaches: - (a) Income approach, (b) Cost approach, (c) Sales comparison/ Market approach.

The Income Approach is based on the present value of cash flow that an asset can be expected to generate during its remaining life (Syagga, 1994). This approach is based on a forecast of the business income and expenses that the property will generate over a given period of time. It assumes that the value of the property is dependent on the ability of all the assets to earn a reasonable return. This approach is best utilized for determining the business enterprise value.

The cost approach is based on the concept of replacement or reproduction cost as an indicator of value. A prudent investor would not be expected to pay more for an item than the amount for which it could be purchased new. Further, to the extent that a particular item provides less utility than a new one, its value will be less than the cost of a new replacement or reproduction. To account for this difference, the replacement/reproduction cost new is adjusted for losses in value due to physical depreciation, functional obsolescence, and economic obsolescence (Budhbhatti, 1999).

The Market Approach involves a direct comparison of the property being appraised to similar properties that have sold in the same or in a similar market. This approach is based on the principle of substitution which implies that a prudent person will not pay more to buy a property than it will cost to buy a comparable substitute property.

Plant and machinery valuations are generally commissioned with the following purposes as articulated by Graham (1989), Mahajan (1998), Budhbhatti (1999) as quoted by Okoth, (2003):- Bankruptcy; here the valuation is required to estimate the likely net recovery from the forced sale of plant and machinery. Lending institutions such as banks, cooperatives, foreign institutional investors amongst others to enable them make sound decisions as to what extent to advance the borrower. Other purposes to which valuations are required includes; Accounting purposes, Insurance, Management planning, Tax purposes, Allocation of purchase price, Condemnation, Business valuation for sale, incorporation, partnership formation, merger and rating amongst others.

There are typically three types of valuation studies that can be performed. The three being inventory, site inspection, and desktop. **The inventory appraisal** is utilized when an accurate asset listing does not exist. This approach requires a detailed inventory and inspection of all the assets. **The site inspection appraisal** involves a detailed inspection of all or a representative portion of the assets. This inspection is utilized to determine the physical condition, and to verify the existence of the major assets.

**A desktop appraisal** is utilized when timing is short, or a site visit is not required. A detailed asset listing must be provided and personnel familiar with the assets should be available to discuss their condition.

Kyeti (2005) observed that literature that exists on plant and machinery valuation tends to cover the general area of the field. He further noted that the work of Marston, et al (1982) concentrated much on cost approach with emphasis on depreciation. Budhbhatti (1999) majorly concentrated on the philosophy of plant and machinery valuation and was inclined more to environmental factors.

## 1.1 Problem Statement

Valuation of plant and machinery is a process requiring knowledge in law, economics, insurance, industrial process, environment and planning. Budhbhatti (1995) asserts that although there are different valuation approaches/methods a valuer can apply, unlike with other types of real property, where purpose determines the method, for valuing plant and machinery the process is not so straightforward. It all depends on several factors / circumstances such as age of the equipment, level of maintenance, whether income generating etc. There is no direct formula and as such one should always select the method which allows him/her to arrive at sound conclusion. When conducting the valuation of plant and machinery as is the case in real estate, the valuer is usually faced with lack of evidence of market sales from which to decipher a comparable sales analysis or compute the income stream attributable to the property (Shores, 1990). The lack of sales evidence eliminates the possibility of applying either the sales comparison or income approaches to value. Therefore, the valuer is required to combine skills of engineering and valuation and thus apply a depreciated cost approach still with its weaknesses.

There are various challenges confronting the valuation profession as a whole but more so plant and machinery valuation. They emanate as a result of many factors; mainly because of the nature of valuation exercise, the approaches adopted, issues pertaining to the data sought, their sources and other exogenous causes. The issues in valuation of plant and machinery are well illustrated and summarized hereunder:-

Case for Illustration of Plant and Machinery Valuation & Its Challenges.

[www.positude.org](http://www.positude.org)

### ***'Valuation of a 270 Square Kilometre Salt Producing Lake'***

#### ***Valuation of Plant and Machinery for Salt Production***

*'The Plant & Machinery is basic in nature and consists of - Water Pumps, Generators, Engines, Woodworking Machinery, and General Workshop Machinery. The Salt processing plant consists of Washery Unit, Crushing, drying Unit and Iodization Plant etc. The Plant & Machinery have an age varying from 25 years to 75 years, it is technically obsolete, but is still being used- as the current use does not require highly sophisticated Plant & Machinery. But, there would be no market for such old Plant &*

*Machinery. With passage of time, the various processing units have capacity imbalances leading to functional obsolescence. For many of these, current replacement cost new is not available; many others have been fabricated in-house. ISSUE: How to find Gross Current Replacement Cost? How to take into account the issue of Non-marketability? How to Quantify Obsolescence?'*

Valuation of plant and machinery is a very complex process and is usually faced with many challenges. This has been observed by many writers such as Okoth (2003), Agabian and Graham (1989). The availability and reliability of relevant data has been cited as a critical factor towards sound value opinion Budhbhatti (1999). The access and interpretation of market data is crucial to the process of valuation, whatever the method. Theoretically, the greater the availability of market information, the greater certainty can be attached to the resultant valuation, assuming good analysis. Consequently, well-informed markets can be characterised as low risk and poorly informed markets as high risk. Unfortunately, in both developed and undeveloped countries data storage and update has been a mirage. For example, in valuations commissioned by GTZ-Government of Kenya, GTZ - UWASAM for Inventorisation and preparation of assets register - Water and Sewerage Departments in several Municipal Councils, data availability was cited as a major hindrance to plant and machinery valuation.

The methodology used is replacement cost by engineers. Unfortunately, valuers rely on engineers who are basically trained on only cost approach and are not conversant with other valuation methods. Consequently the values returned do not actually reflect the true values of plant and machinery and this should not be the case. Therefore, there was need to critically examine the manner in which the exercise is conducted and approaches used in valuation of plant and machinery in Kenya.

## **1.2 The Study Objectives**

- (i) To examine plant and machinery valuation approaches used in Kenya, their challenges and weaknesses.
- (ii) To find out the implications of the approaches on values of Plant and Machinery
- (iii) To suggest possible measures and solutions to alleviate plant and machinery valuation challenges geared towards achieving more justifiable value opinion.

### **1.3 Hypothesis**

The existing plant and machinery valuation approaches are inadequate due to unavailability of market/ verifiable data.

### **1.4 Research Methodology**

The research is based on case studies to investigate the commonly used plant and machinery valuation approaches namely; Replacement Cost New, Income and sales Method. In addition, the manner in which plant and machinery valuation is conducted in Kenya. A case study entails studying a phenomenon within its real life setting rather than studying a phenomenon in general. A specific example within time and space is chosen for study. This allows a particular issue to be studied in depth and form a variety of perspectives (Rob Kitchin & Nicholas 2000:225). Basically, processing industry will be considered as the sector that offers wide components and further is more complex unlike other industries.

### **1.5 Data Collection**

The most important research instrument used in data collection was documentary review from related literature. Interviews, questionnaires and other observations supplemented the documentary review where it was evident that certain type of data was lacking or not accessible. The type of data was both quantitative and qualitative depending on the requirements posed by the research question. Quantitative data is considered strong in giving answers to "how many" and "how much" questions. However, the understanding of 'why' things happen is better answered by the qualitative questions, perceptions and behaviour (Rob Kitchin et al 2000: 211) in this study, the quantitative and qualitative data are considered complimentary to each other.

Data was collected from both primary and secondary sources. Primary data was collected using questionnaires administered on selected ten (10 No.) large valuation companies in Kenya on how they conduct or handle plant and machinery valuations. Ten (10 No.) major Valuation services consumers (banks and insurance companies) Kenya Revenue Authority (KRA) and other valuation services minor consumers. Oral interviews will also be conducted with other valuers both locally and internationally.

Information from secondary sources will be obtained through reading journals, text books and past valuation exercises conducted in the field.

### **1.6 Research Design**

The study will follow a case study design where actual plant and machinery valuation undertaken will be critically analysed to provide an in-depth investigation into the approaches used in Kenya, their strengths and weaknesses. The purpose of this study together with the nature of data collected influenced the choice of this research design. The key question addressed by this study is how plant and machinery valuation exercise is conducted in Kenya and case study design fits well with this questions.

### **1.7 Scope of the study**

This study focuses mainly on valuation of plant and machinery of immovable/fixed components only. Only plant and machinery of fixed nature will be investigated.

### **1.8 Justification of the study**

The valuation of plant and machinery is a central tenet for any business enterprise. In setting up of any project, valuation of plant and machinery becomes the basic starting point. Crucial managerial decisions affecting the business, for example, whether to raise more capital by floating shares or otherwise, amount to insure, amongst others, depend on the value of the business. Both central and local government sound valuation of plant and machinery can be a useful tool in resource allocation and the formulation of planning policies. The valuation approaches used have a bearing on the final values. Due to the in adequacy of these approaches depending on the circumstances of the case, there are instances of either under or over valuation with serious legal, economic and social repercussions.

Currently, the world is faced with diminishing economic resources; privatization of state owned enterprises is seen as a remedy to the abuse and misuse of resources by the public sector managers. Therefore, given the enormous amount of the world's public sector economic resources accounted for by plant and machinery, then the necessity of accurate valuation cannot be overemphasized in instilling public confidence that state



assets are not overvalued or undervalued. Further, the world has turned to be a small global village. Globalization simply defined means the movement of four economic factors across borders. The first is the movement of plant and machinery representing the physical capital. The second is the movement of financial capital as invested in capital markets. The third is the movement of technology and finally labour movement. Valuation of plant and machinery therefore can be seen as an important aspect in the context of globalization because plant and machinery is one of the major factors that moves globally.

Demand for plant and machinery valuation services is increasing and the mere fact that this should be domain area of valuers in Kenya, Engineers seems to dominate the field and thus need to create more awareness to fellow valuer colleagues in the industry.

### **1.9 Generalization**

It is generally agreed that findings from case studies are not generalizable. These findings from one case study can be related or transformed to another context provided that conditions in such context are similar to those prevailing in the concluded case study (Yin 1994:38; Pattons 1987:167). Similarly finding from this study are not generalizable, they can only be related to another context provided that, conditions in such context are similar to those prevailing.

### **1.10 Definition of Terms**

The Appraisal and Valuation Manual (RICS, 1996) defines the following terms as follows:

**Fair Market Value In Continued Use** The estimated amount, expressed in terms of money, that may reasonably be expected for a property in an exchange between a willing buyer and a willing seller, with equity to both, neither under any compulsion to buy or sell, and both fully aware of all relevant facts, including installation, as of a specific date, and assuming that the earnings support the value reported.

**Fair Market Value - Installed** is the estimated amount, expressed in terms of money that may reasonably be expected for an installed property in an exchange between a willing buyer and a willing seller, with equity to both, neither under any compulsion to buy or sell, and both fully aware of all relevant facts, including installation, as of a specific date. This amount does not have to be supported by the business earnings.

**Fair Market Value - Removal** is the estimated amount, expressed in terms of money, that may reasonably be expected for a property, between a willing buyer and a willing seller, with equity to both, neither under any compulsion to buy or sell and both fully aware of all relevant facts, as of a specific date, considering the cost of removal of the property to another location.

**Orderly Liquidation Value in Place** is the estimated gross amount, expressed in terms of money, that could typically be realized from a failed facility, assuming that the entire facility would be sold intact within a limited time to complete the sale, as of a specific date.

**Orderly Liquidation Value** is the estimated gross amount, expressed in terms of money, that could be typically realized from a liquidation sale, given a reasonable period of time to find a purchaser(s) with the seller being compelled to sell on an as is, where is basis as of a specific date.

**Forced Liquidation or Auction Value** is the estimated gross amount, expressed in terms of money, that could be typically realized from a properly advertised and conducted public auction, with the seller being compelled to sell with a sense of immediacy on an as is, where is basis, as of a specific date.

**Salvage Value** is the estimated amount, expressed in terms of money that may be expected for the whole property or a component of the whole property that is retired from service for use elsewhere, as of a specific date.

**Scrap Value** is the estimated amount, expressed in terms of money that could be realized for the property if it were sold for its material content, not for a productive use, as of a specific date.

**Insurance Replacement Cost** is the replacement cost new as defined in the insurance policy less the replacement cost new of the items specifically excluded in the policy, if any, as of a specific date.

**Insurance Value Depreciated** is the insurance replacement cost new less accrued depreciation considered for insurance purposes as defined in the insurance policy or other agreements, as of a specific date.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Plant and Machinery

##### 2.1 Introduction

The central task in valuation is to define value. In 1848, John Stuart Mill authored the "Principles of Political Economy" wherein he opined "..... happily there is nothing in the laws of value which remains for the present or any future writer to clear up; the theory of the subject is complete....". The theory is simple-the application is complex. History has vindicated Bonbright (1937) for describing the appraisal profession as a "dangerous profession". The peril of the profession does not lie in the fallible process of valuation, which is adopted to resolve the client's problem about property value. Thus, the dangerousness of the profession lies in the way valuer's apply the valuation foundations (i.e. principles, concepts and factors affecting property value) to address their clients' valuation problem(s). The problem(s) that beset(s) the valuer in any valuation assignment stems from the fact that he is called upon to estimate "something" (i.e. value) which is "indefinable"! Even when placed in the realm of the market, every definition of market value has been a focus of controversy.

The evolution of plant and machinery has led to the change in manufacturing sector and the creation of other goods and services industries. Technology growth over the past two decades has allowed for new industries such as that in telecommunication to thrive, while the more traditional manufacturing industries has experienced a decline. With increased privatisation of public utilities there has been greater sale and rental evidence of these assets as a going concern, allowing greater market analysis.

Before discussing valuation methods for plant and machinery, it is important to identify and understand the relevant characteristics of plant as used in different valuation purposes. In explaining how the valuation of Plant and Machinery for rating purposes for example is applied, I will begin with the broadest of principles and illustrate how it applies to specific cases. These principals include; plant, hereditament; degree of annexation; and vacant to let.

### 2.1.1 Plant

Plant is a contentious issue in valuation and more so particularly in statutory valuation, and this doesn't just relate to how much it is worth but whether it should be included or not. Therefore it is important to have an understanding of the definition and nature of the term (Farthering, R.1997 p.47)

In the *Waratah Gypsum Pty Ltd v Commissioner of Taxation* (1965) 112 C.L.R 152 McTiernan J at 161 defines plant as "the fixtures implements and machinery used in an industrial process" The items regarded as "plant" in this case comprises "the conveyor belt, and railway trucks and sleepers, the workshops, the fuel store and the office," which were used for an open cut mining operation.

The meaning of the word "plant" was considered by the Supreme Court of N. S.W (Full Court) in *Australian Gas Light Co. v Valuer-General* (1940) 14 L.G.R. (N.S.W) 149 for the purpose of ss. 5(2) and 7(2) of the Valuation of Land Act 1916 (N.W.S) where Jordan C.J. found at 156, that:

'Plant' is a very general expression which in a certain context may be capable of including permanently fixed things such as buildings, but is evidently used in a more restricted sense in its present context. These considerations point to the conclusion that what is meant by plant, may be removed from the premises without structural damage there to, is things of the kind mentioned which can be removed without causing any damage to the structures on or in the land of a permanent character and in the nature. For example, of building, roads or reservoirs, as contrasted with structures such as machines or removable fittings. It was contended that a permanent building should be excluded if it is so constructed as to admit of its being readily removed without injury to the surface of the earth or to any fixed foundations embedded in the earth; but the condition of exclusion is that the thing shall be capable of being removed without structural damage to the premises'. It is obvious that part of a permanent building be removed without causing structural damage. .... Such a removal would obviously cause damage to the premises regarded as structure-bearing land."

Subsequently this issue was considered by Hardie .J., sitting in the Land and Valuation Court of N.S.W., in *Australian Gas Light Co v Valuer-General and Anor.* (1969)17 L.G.R.A. 125. In that case the item in dispute was a large spherical gas holder. In deciding as to whether it was an item of plant, the judge noted "it is relevant to consider not only its design, size, method of construction and mode of attachment at the soil, but also and most importantly, its use and function". The court held that it was so fixed that it could be removed without damage to the premises and thus fell within the definition of "plant and machinery".

Thus the decision as to whether particular items are fixtures or otherwise, depends on the facts in each individual case.

### **2.1.2 Hereditament**

The case law that establishes the principal of Hereditament comprises three parts: (a) The Land; (b) Buildings and Structures (i.e. chimneys, roads, tram lines etc); and (c) Plant and Machinery of infinite variety according to the nature of the Industry

Hereditament derives from English Land Law in reference inheritable meaning passes automatically to the owner's heirs on his death. In legal terms hereditaments are divided onto corporeal, those things which have an effect on the senses, and have a physical being and can be seen or handled and incorporeal having no substance but nevertheless creating some interest in the land which can be enjoyed. The land and building is described as a corporeal hereditament while the lease is an incorporeal hereditament.

### **2.1.3 Degree of annexation.**

A fixture depends essentially on the intention with which the item was put in place. The two considerations which are commonly regarded as relevant in determining the intention with which an item has been fixed to the land are:

- a) The degree of annexation. ✓
- b) The object of the annexation.

The early statement of the law in this regard can be found in the judgement of Blackburn J in *Holland v Hodgson* (1872) LR7 CP328.

"There is no doubt that the general maxim of the law is that what is annexed to the land because part of the land; but it is very difficult, if not impossible, to say with precision what constitutes an annexation sufficient for this purpose. It is a question which must depend on the circumstances of each case and mainly on two circumstances, as indicating the intention, viz, the degree of annexation and the object of the annexation. When the article in question is no further attached to the land than by its own weight it is generally to be considered a mere chattel. But even in such case, if the intention is apparent to make the articles part of the land, they do become part of the land .... On the other hand an article may be very firmly fixed to the land and yet the circumstances may be such as to shew (show) that it is never intended to be part of the land, and then it does not become part of the land. ... Perhaps the true rule is, that articles not otherwise attached to the land than by their own weight are not to be considered as part of the land, unless the circumstances are such as shew that they were intended to be part of the land, the onus of shewing that they were so intended lying on those who assert that they have ceased to be chattels, and that on the contrary, an article which is affixed to the land even slightly is to be considered as part of the land unless the circumstances are such as to shew that it was intended all along to continue a chattel, the onus lying on those who contend that it is a chattel."

In *Australian Provincial Assurance Co limited v Coroneo* (1938) 38 5R NSW judgement of Jordon, with whom Davidson and Nicholas concurred, expressed the principles and test to be applied as follows:

"A fixture is a thing once a chattel which has become in law land through having been fixed to the land. The question whether a chattel has become a fixture depends upon whether it had been fixed to the land, and if so for what purpose. If a chattel is actually fixed to the land to any extent, by any means other than its

own weight, then prima facie it is a fixture; and the burden of proof is upon anyone who asserts that it is not; if it is not otherwise fixed but is kept in position by its own weight, then prima facie it is not fixture; and the burden of proof is on anyone who asserts that it is: *Holland v Hodgson*. The test of whether a chattel which has been to some extent fixed to land is a fixture is whether it has been fixed with the intention that it shall remain in position permanently or for an indefinite or substantial period: *Holland v Hodgson* or whether it has been fixed with the intention that it shall remain in position only for some temporary purposes. *Vaudeville Electric Cinema Ltd v Muriset* (1923) 2 Ch. 74 at p 87. In the former case, it is a fixture, whether it has been fixed for the better enjoyment of the land or building, or fixed merely to steady the thing itself, or for the better use or enjoyment of the thing fixed. . . . If it is proved to have been fixed merely for a temporary purpose it is not a fixture: *Holland v Hodgson*; *Vaudeville Electric Cinema Ltd v Muriset*. The intention of the person fixing it must be gathered from the purpose for which and the time during which use in the fixed position is contemplated: *Hobson v Gorringe* (1897) 1 Ch 192; *Pukuweyka Sawmills Ltd v Winger* (1917) NZLR 81. If a thing has been securely fixed and in particular if it has been so fixed that it cannot be detached without substantial injury to the thing itself or to that to which it is attached, this supplies strong but not necessarily conclusive evidence that a permanent fixing was intended. . . . On the other hand, the fact that the fixing is very slight helps to support an inference that it was not intended to be permanent. But each case depends on its own facts.”

The degree of annexation of the plant and machinery is not the determinant of its rateability. If this was the test it might operate with great injustice as between one hereditament and another for obviously the degree of annexation or mobility of plant and machinery depends upon the character of the industry in which they are employed.

#### **2.1.4 Vacant to let.**

It is the vacant to let principal of the entire property that must be assessed in the valuation. This is the rent which the premises would command in its existing condition, if it were let to an ordinary tenant from year to year. The property is in the same mode of



occupation and subject to the same restrictions or privileges suffered or enjoyed by the present occupier who must be registered as a possible tenant.

Valuation of plant and machinery is a complex matter of techno-commercial evaluation and requires thorough knowledge of functions of the machine, its useful economic life, causes which render it less efficient in its performance, technological improvements in its function and condition etc. It would, therefore, not be possible to determine the value of machinery simply by the number of years it is used. A machine extensively used or not properly maintained may become useless much before its normal life as against a machine of the same type which is well looked after and its maintenance and servicing is done as per manufacturer's specifications schedules. Where plant and machinery has been sparingly used, it may have considerably longer residual life, notwithstanding the years of use. In developing countries which are short of capital, it is a common practice to use the machinery for a much longer period than the life stipulated by original equipment manufacturer.

Honorable David Laro of United States Tax Court, Washington, D. C, on valuation once remarked "anyone approaching the subject of valuation should be aware of certain truisms as a frame of reference. They are:-

- Each valuation case is unique. Although guidance can be obtained from earlier cases, each case is unique. One case is rarely on point with another, and a significant differentiation of the facts can usually be made.
- In valuation there are no absolutes. There are only general guidelines to which individual judgments must be applied.
- There are no irrefutable "right" answer.
- Courts strive to arrive at the "right" answer and generally do. However, courts are fallible and have no monopoly of wisdom. Justice Jackson once said "we are final not because we are infallible, but we are infallible only because we are final."  
"Brown vs. Allen, 344 U.S. 443, 540 (Jackson, J., concurring in result)."
- Experts will and do differ.
- There are available methods which are generally recognized and accepted by the appraisal profession and the courts."

## **2.2 Approaches to Valuation of plant and machinery**

The terminology of "approach" and "method" demand a careful differentiation as we apply the concepts in the realm of valuation. In common parlour the words get interchanged, but the dictionary versions convey different shades of meaning. While going through the above definitions it will be observed that "approach" is the broader of the two concepts. The approach is a way of coming toward value, whereas method is the actual process or orderly step by step procedure for obtaining a specific value. It would therefore appear that approach is a broad category encompassing several methods to conform to the approach. It is, however, possible that there may be only one method within one or more approaches for valuation. Generally, there three commonly accepted methods (Budhbhatti, 1999):

### **2.2.1 Cost Approach**

This approach is based on the principle of substitution i.e. no prudent investor would pay anything more for a property than it would cost to produce a substitute with similar utility as the subject.

It should be noted however that when applied to the valuation of fixed assets for financial statements, Valuation Practice Statements generally require that this method must be accompanied by a qualification that the final valuation figure is "subject to adequate potential profitability". However, if the potential profitability could be confidently predicted surely it would be better to value the property by discounting the future net cash flows, i.e., the discounted future benefits derived from the property. Strictly, Depreciated Replacement Cost is not a methodology but a basis of valuation defined by The Appraisal and Valuation Manual (RICS, 1996) and is used to identify 'Existing Use Value' and not market value. However, this approach is incorporated within the discussion, as it is a basis that is adopted in low/no transaction markets.

### **2.2.2 Income Approach**

Discounted Cash Flow, provides the present value of estimated future net income. This obviously involves the selection of an appropriate discount rate and the ability to estimate the future net cash flows with some degree of confidence. Clearly, this method

can be applied to the analysis of market sales, but it can also be applied to properties that are rarely if ever sold but where there is an ascertainable future cash flow.

### **2.2.3 Market Approach**

Value is based on an analysis of market transactions involving similar properties- plant or machine. This requires an analysis of sale prices and the terms of sales of comparable properties recently sold in the open market (Graham, 1989).

### **2.2.4 Depreciated Replacement Cost (DRC)**

An alternative valuation method sometimes employed is replacement cost and depreciated replacement cost. This is adopted where specialised properties need to be valued on an existing use basis rather than for open market value. 'Existing Use Value' as a basis of valuation is adopted for properties that are not investment properties but are properties occupied for the purposes of the business. Within this definition there is a presumption that the property can be used for the foreseeable future only for the existing use.

This method is applied where there is no rental or rental evidence, and is based on the logical assumption expressed by the Solicitor - General of England and now Lord Simon of Glaisdale, in *Dawkins v Leamington Spa & Warwickshire CC* (1961) L T as quoted above in the court precedent.

This method can also be broken down into a six step process that assesses the cost in annual terms the hypothetical tenant to provide the hereditament.

- (i) Cost of construction a simple substitute building capable of performing the same function, including plant and machinery, site works, fees etc.
- (ii) Deduct for Age, Obsolescence and other occupation factors. This calculates the Capital Improved Value reflecting the adjusted replacement cost. The objective of this stage is to convert cost into value.
- (iii) Establish the cost of the site clear of buildings with all services available. Value of the site *rebus sic stantibus*, as if limited to the existing use.

- (iv) Apply the decapitalisation rate. The decapitalisation rate converts capital costs into annual cost.
- (v) Take into consideration all the relevant matter not already included. i.e. poor site access.
- (vi) Consider the relative bargaining strengths of the parties. "Stand back and take look stage." Reviewing the valuation is critical.

In applying the Contract Basis, the valuer takes into consideration the bargaining which takes place between a Hypothetical landlord and tenant. Determining the relative bargaining power of both parties to assess a rent that would reflect the tenancy on a statutory basis.

### **Specialised properties**

The Appraisal and Valuation Manual (RICS, 1996) defines specialised properties thus: "Specialised properties are those which, due to their specialised nature, are rarely, if ever, sold on the open market for single occupation for a continuation of their existing use, except as part of a sale of the business in occupation. Their specialised nature may arise from the construction, arrangement, size or location of the property, or a combination of these factors, or may be due to the nature of the plant and machinery and items of equipment which the buildings are designed to house, or the function, or the purpose for which the buildings are provided."

Examples of specialised properties include oil refineries and chemical works; power stations; schools, colleges, universities etc.; hospitals; and museums libraries etc.

Practice Statement 3.5 relates to specialised properties and states that:

"Except in the case of land and buildings held for development the Depreciated Replacement Cost (DRC) basis is used to arrive at the net current replacement cost required for accounting purposes for those properties in respect of which, due to their specialised nature, there is a lack of demand or market in isolation from the undertaking using it."

It should be noted that this basis is only required to be used on an existing use basis and does not purport to be an open market value and thus a proxy for transaction price, which is the prime function of market value. However, it could be argued that in low transaction markets this methodology might be of assistance in determining market value.

Gross current replacement cost means the cost of replacing an existing asset with an identical or substantially similar new asset having a similar production or service capacity, including costs of transport, installation, commissioning consultant's fees, non-recoverable taxes and duties and finance cost up to the stage of commercial production- The cost of design is to be looked from the point of view of plant reconstruction rather than the cost of the original assets. Provided therefore that the plant has not been valued on the basis of comparison with a modern equivalent asset, then there is no need to allow for the cost of repeating work that has already been executed and is stored on file. If the plant is being valued on the basis of modern equivalent asset, however, relevant design work will form a legitimate item of expenditure.

Value to the Business of Plant and Machinery will normally be net current replacement cost except where a permanent diminution below this level has been recognized, in which case value to the business will be the recoverable amount.

Net Current Replacement Cost is established by depreciating the Gross/Current Replacement Cost in order to reflect the value attributable to the remaining portion of the total useful economic working life of the asset, after taking due account of age, condition, obsolescence and other relevant factors, including residual value at the end of the asset's useful economic working life.

- Factors which can affect future utilisation of the Plant and Machinery , such as, finite material supply source, the limited life of buildings housing the plant, limited tenure of land and buildings and limited planning consent, shall be taken into account in valuation.

- In arriving at the value to the Business of a company's Plant and Machinery, it is necessary to consider the value of the assets as a total integrated package rather than simply as the sum of the individual machines valued; therefore, incompatibility of particular plant assets, imbalances between the capacity of different production sections, poor plant layout and similar factors which may affect the overall efficiency of the manufacturing facility shall be taken into account appropriately.
- Value to the Business of Plant and Machinery asset based primarily upon net current replacement costs, shall be expressed by the Valuer as being subject to the adequate potential year-on-year profitability of the business having due regard to the value of the total assets employed and the nature of the operation.
- The Pilot plant tests the feasibility of a manufacturing process on a reduced scale. Once the main plant is operating the pilot plant may be superfluous, and same shall be valued as surplus to the manufacturing facility at its highest and best use value. However, if the same can be used to develop new process or effect improvement then it should not be considered as superfluous.

Hicks (1993) suggested that, in depressed market conditions, the DRC approach over valued specialised buildings.

"This rather esoteric and unworldly valuation method was workable at a time when building costs were rising. However, the slump in building tender prices since their peak in 1990 is causing severe problems and undermining the logical basis of this method."

The issue arose as a result of the interpretation of what is now PS 4.8.2 which states 'The cost to be estimated is not to erect a building in the future but that to have the building available for occupation at the valuation date, the work having commenced at the appropriate time.'

Hicks argues that, given that specialist buildings are of a substantial size, and may take two or three years to build, valuers are being directed to use building cost data from this period before the valuation date. If, as in the UK in the recent past, there has been a

reduction in values and building costs, the result of inputting such historic data into the process may be an overvaluation of the asset. An under valuation could similarly occur in a rising market, again as a result of using lagged data in the methodology.

A counter to this argument is made by Britton, Connellan & Crofts (1991) who suggest that a one year building contract would have been on a fixed price basis which anticipated any changes in labour and material costs before completion, and that a longer contract would have involved a fluctuating price to enable any actual cost changes to be recovered.

Other criticisms relating to cost based approaches of valuation are well rehearsed. A common criticism is that cost based valuations do not respond to changes in the way that values change in the market. Britton, Connellan & Crofts (1991) suggest that changes in market value in the short or medium term tend to be site value changes, not building value changes, and as can be seen from the definition of DRC above, the market is the primary source of evidence of land value. However, in low transaction markets, evidence relating to land value itself may be sparse resulting in a circular argument!

Further adjustments need to be made to the cost element within the methodology. These adjustments relate to depreciation and obsolescence. It has been stated that 'the cost technique suffers from an even more serious deficiency; the subjectivity of the depreciation estimate'. (Shenkel, 1978). There are three types of obsolescence: Technological, Functional and, Economic (Alico, 1989).

**(a) Technological obsolescence:**

Technological obsolescence is due to change in design and materials of construction of the Plant and Machinery under consideration. Latest sophisticated equipments with reduced occupancy, improved efficiency or optimum energy consumption are common in Plant and Machinery. Technological obsolescence may arise out of development of new technology which brings in changes in rate of production or reduction of operating cost. The need for adequate familiarity of the

valuer with such a situation is more emergent in present high-tech-environment than before. Enough exposure to and background experience of the know-how of technology is essential for a valuer. In case he is not fully competent, he shall refer appropriate matters to experts.

**(b) Functional obsolescence:**

Functional obsolescence arises when a machine already in function loses its optimum capacity owing to a decline in co-operation from its operating counterparts. It may arise due to variety of internal reasons. The company may have been compelled to commission a machine of high-rated capacity simply because a low-rated one is not available and the operating counterparts, whether it is labour or capital, are not geared to give the highly rated machine the opportunity for optimum output. Functional obsolescence may also arise due to faulty design or wrong location of industrial undertaking.

Functional obsolescence is also known as decrease in value due to non-availability of spares or accessories, or any other allied factors. Operating obsolescence is known as the present worth of the future excess operating cost of a machine. The valuer is expected to appropriately account these factors with relevant data to arrive at credible presentation.

**(c) Economic Obsolescence:**

This is due to factors external to the Plant and Machinery itself. This could be due to change in demand of the product manufactured or shrinkage in supply of raw materials and labour, legislation affecting taxes or duties, environmental or zoning controls etc.

Economic obsolescence is not to be confused with sickness in industry. In India, sickness of industries has been the subject matter of a legislation entitled, "The Sick Industrial Companies (Special Regulation) Act, 1985 wherein the expressions "sick industrial undertaking" has been defined as follows :



"Sick Industrial Company" - means an industrial undertaking (being a company registered for not less than five years) which has at the end of any financial year accumulated losses equal to or exceeding its entire net worth.

Britton, Connellan & Crofts (1991) suggest the use of the Discounted Asset Rent Method to fix depreciation allowances. It requires inputting five variables as follows; discount rate; building cost; site value; age/future life of building; the pattern of change in rental value over the life of the building until it reaches an annual figure representing site value. Whilst analysis and judgement is required in respect of each of these variables, only site value needs to be ascertained from the market itself. Thus this cost based methodology may be useful in low transaction markets.

Rand (1986) suggests that 'when the sales comparison approach is not possible because there simply are no comparable sales, it is probable that the cost approach is indicated as the most appropriate approach to value.'

This discussion highlights some of the issues relating to the DRC approach and confirms potential uncertainty over inputs such as cost, level of depreciation, etc

Accordingly, this cost based approach has limitations when seeking to identify market value in low transaction markets.

### **Capitalisation Models**

To assess market value the standard valuation methodology adopted for investment properties that are income producing is the investment method. This approach simply regards income-producing property as an investment with the value of the property depending upon the return expected from such an investment.

Money invested (for example in securities or a bank) produces a regular income, the capital investment and the income are related by the yield; where the income continues, unchanged, indefinitely. If two of the three variables (capital, income and yield) are known the third can easily be calculated.

Valuation of income-producing properties in market economies is generally based on the comparable sales method. The basis of comparison is usually the estimate of full rental value and the all risks yield, whereby the valuer selects "comparables" and makes tempering judgements about these together with additional information about such matters as the influence of economic and market trends. For properties let at the current full market rent, this rent is capitalised (divided by a yield or "cap" rate) to obtain the property's capital value.

Assessment of rent, except in very unusual circumstances, is made by comparison. Thus if one factory has been let at £50,000 per annum a similar factory in the same locality would expect to let, on the same terms, for £50,000. As buildings are not identical, adjustments have to be made for the differences. Factors such as age and type of construction, arrangement of accommodation, facilities provided and very importantly location and accessibility, affect rentals and the valuer has to adjust his figures to take account of these differences. Various automatic or semi-automatic approaches have been advocated to make this process more reliable and efficient (e.g. Gau *et al*, 1992).

A profit valuation will be applicable to a hereditament where (a) it is clear that the rent that a tenant might reasonable expect to pay will be determined by the profit that be seen to have been made or is likely to be made and (b) that those are profits of cannot be expected to be made otherwise than by the of the particular hereditament. Generally, this means that the hereditament and business must be linked by law (as with licence premises or physical circumstance or both so that they are virtually inseparable.) or by physical circumstance or both that they are virtually inseparable.

This method of valuation, the value of the rateable hereditament, including plant that must be taken into account, is deducted from the amount of the profit accruing from the business. This plant is not required to be separately estimated unless the valuer wishes to calculate a sinking fund contributing to represent the occupier's statutory liability under the hypothetical tenancy. It is more usual now to allow the actual average expenditure on renewals in preference to a calculated sinking fund, but much depends on the actual circumstance.

This method can also be demonstrated in the spreadsheet calculation, detailed as follows:

Gross Profit - reasonably maintainable.	\$XXXXX
Less Working expenses (excluding rent and rates)	<u>\$XXXXX</u>
Equals Net Profit (Divisible balance)	\$XXXXX
Less Tenants Share	
Including (a) Time and trouble in arranging letting.	
(b) Relevant proportion of return on tenants capital.	
(c) Risk	<u>\$XXXXX</u>
Rent and rates and Land tax	
\$XXXXX	
Less Rates and Land Tax (calculate)	
\$XXXXX	
Net Annual Value	<u>\$XXXXX</u>

Profits method valuations have been used to value hereditament of hotels, petrol stations, caravan sites etc (Gibson, H & Jackson E., 1992 p 99-118).

The capitalization rate is the average ratio of one-year cash flow to sales price for similar properties sold recently. Yields depend upon security and regularity of income. Variation in yields will depend on the market's perception of the relative risk and growth expectations for the property. Properties whose cash flows are expected to grow at above average rates or where expected growth is perceived to be less volatile, will have lower yields, and vice versa.

The capital value represents the present value of the right to receive the perpetual annual sums. Hence it can be seen that investment valuation is based on shifting sums of money in relation to time and this is simply achieved for perpetual incomes. In practice rents are seldom received in perpetuity, usually the rent increases at intervals and in many cases (e.g. with leasehold terminations), the income actually comes to an end.

The problems that varying and terminating incomes produce can easily be overcome in an investment valuation. Where incomes change in an upward direction, the calculation is undertaken by finding the present value of each separate (unchanging) income flow (the final one being perpetual) and then, as appropriate, taking the present value of each of these (calculated) future capital sums.

The yield at which an income is capitalised depends upon the risk (including that relating to income growth) involved. Where a property is producing an income below its final rental value then there is a definite opportunity to increase the rent at the next rent review or lease renewal. If the income is to increase within a few years (say up to five) then the current income can be regarded as more secure than that likely to be achieved later. Consequently, the current income may be capitalised at a slightly lower yield than if the property was let at its full rental value to reflect a lower default risk.

Greenwell and Co. (1976) criticise the valuer's "conventional" method of valuation (viz the income/investment method) for its implicit assumptions to argue explicit assumptions about future trends of rent, inflation, cost of capital, etc. The Trott Report (1986) is the culmination of the deliberations of a working party that was set up in 1975 by the Royal Institution of Chartered Surveyors (RICS) to "identify the present agreed and accepted methods of valuation ... and to consider to what extent these are deficient in any respect" (Trotts 1986:ix). The foreword to the report reads, inter alia, "Our original dream was to produce a Standard Method of Valuation but we are still some way from achieving such a definitive work". Trott (1986) criticises the income method for its implicitness to recommend the discounted cash flow method [see also Greaves (1972), and Baum (1983)].

### **2.2.5 Discounted Cash Flow (DCF)**

There has been some debate in the UK regarding the use of DCF as an alternative to traditional methodologies for large investment properties where there are few properties of a similar nature and where the market for such properties is limited. Given this scenario there are likely to be few transactions to provide comparable evidence, the basis of the traditional methodology.

The floatation of Capital Shopping Centres (CSC) in the UK in 1994 focused debate on this area. The company, which owned Thurrock Lakeside, a regional out of town shopping centre, published a discussion paper on the valuation of such assets. It suggested that 'In the case, for example, of out of town regional shopping centres (of which there are only a few in the UK), the assumption in the definition of open market value of a hypothetical willing seller is fallacious because each centre has unique qualities which, if the centre is held by a long term property investment company, endorse the property with a scarcity value which is part of the value in use and which should be reported to shareholders. Given the nature of the property the chief executive of CSC argued that, as there were no sales of similar properties and thus no comparable evidence, he required a valuation methodology that looked forward, not backward. He espoused valuing such shopping centres by considering their future income streams, i.e. the use of DCF approaches. The approach would be no different incase of factories comprising plant and machinery such as Magadi Soda Company in Kenya.

### **2.2.6 Market Approach**

The quest for explicitness in valuation has led to criticism also of the comparison method, which is acclaimed to be a reliable and accurate technique for valuing properties. The criticisms centre on the choice of comparables [Vandell (1991) and Gau et al (1992)] and how adjustments are made for the elements of comparison [Kroll and Smith (1988), Cronan et al (1986), Ratcliff (1965), Shelling et al (1985), Wright and Gilliland (1981) and Wilson (1997)]. It is contended that valuers do not explicitly incorporate market behaviour data into the adjustment process [Ratcliff (1965) and De Lisle (1984 and 1985)].

### **2.2.7 Data Interpretation and Analysis**

The access and interpretation of market data is crucial to the process of valuation, whatever the method. Theoretically, the greater the availability of market information, the greater certainty can be attached to the resultant valuation, assuming good analysis. Consequently, well-informed markets can be characterised as low risk and poorly informed markets as high risk.

The concept of uncertainty in valuations was identified in the Mallinson Report (1994) in which it is argued that all valuations are uncertain. A valuation figure is an individual valuer's estimate of the exchange price in the market place. Valuations are not a statement of discerned, objective fact, but rather deduced assessments that give an expert's opinion. The issue of uncertainty is further discussed in Mallinson & French (2000). Uncertainty is not clearly defined as it is acknowledged that "there are great difficulties in identifying accuracy in property valuation". However, they suggest that in viewing a hypothetical transaction through the eyes of a hypothetical buyer "a valuer will be uncertain about the current availability of buyers, their current attitude to price, and what they would make of the particular property". This uncertainty leads to uncertainty in the valuation figure and that there is therefore no single "correct figure" but rather a figure within a range of figures.

Ekelid et al (1998) studied the treatment of uncertainty in appraisals of commercial property in the Swedish market they identified three different approaches to measuring accuracy or the quality of valuations from past studies. They then employ a fourth approach, which is to review the information contained within valuation reports and whether this information changed over time. They found that valuers had dealt with uncertainty over time by the following:

- (i) Using several different methods as a way to reduce uncertainty.
- (ii) Applying consistency in assumptions.
- (iii) The use of point estimates and ranges.
- (iv) The use of sensitivity analysis.
- (v) Discussion of the stability of the market.

By applying the above similar suggestions for example using several different valuation methods to counter check the values arrived at as opposed to using only one method a way to reduce uncertainty and applying consistency in assumptions a more justifiable value opinion can be achieved.

## CHAPTER THREE

### METHODS AND APPROACHES USED IN VALUING PLANT AND MACHINERY

#### 3.0 Introduction

#### 3.1 Market Value

The first academic attempts to explain market value were developed by the classical school of economics as led by Adam Smith and David Ricardo, who regarded value as being an intrinsic part of commodities. It was then believed that a combination of factors of production namely, land, capital and labour necessarily created value (Mcknight, 1994). Over time other scholars discovered that some other factors had an influence on value. The Austrian economists were the first to name these factors as led by Carl Menger in the late nineteenth century. They demonstrated that value is a product of a commodity's *marginal utility*. Since then other scholars modified and polished this basic idea (Ibid).

A number of definitions of market value that follow here below will illustrate the above:

- *'The most probable selling price .... (given a period of time ... in accordance with the typical market behavior for this kind of property).'* (Ratcliff, 1968:36, 38).
- *'In economics the term Value means the rate at which a particular good or service will exchange for other goods or services'* (Harvey, 1978: 49).
- *'The most probable price, as of a specified date, ... for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self interest, and assuming that neither is under undue duress'* (The American Institute of Real Estate Appraisal, 1992: 20).
- The Appraisal and Valuation Manual published by The Royal Institution of Chartered Surveyors defined in (1996) as follows;

*'The estimated amount for which an asset should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after*

proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion.' This is the definition settled by the International Valuation Standards Committee and is becoming widely adopted throughout the world.

Recent years have witnessed growing interest on the long time controversy surrounding the definition of market value. In an attempt to solve the above problem, Lind (1998: 172) discussed three criteria for a good definition of market value:

- (i) *'The definition should be clear.'*
- (ii) *'In many cases, it should be possible to know the market value with a reasonable degree of certainty.'*
- (iii) *'The market value should be relevant for most actors on the market most of the time.'*

In making reference to specific contents of the standard definitions outlined above the scholar (Ibid.) pointed out that 'the definition shall not include redundant components that make no addition to the content of the definition'. Along this line and on the basis of the three criteria for a good definition of market value as outlined above, special attention was drawn to three components of market value definition and concluded as follows (Ibid: 172-3):

- (i) *'The definition should not include references to the prudence and knowledge of the buyers and sellers, primarily because this leads to a definition with questionable relevance for a market with very heterogeneous agents.'*
- (ii) *'The definition should not include a reference to willing buyer and willing seller, primarily because these terms are redundant given the condition of proper marketing. '*
- (iii) *'The reference to expected price or most probable price in the definition of market value, should be interpreted in terms of rational degree of confidence in a price in a certain interval and not in terms of relative frequencies.'*

In the end Lind concedes that there are situations whereby the concept of market value may be difficult to apply particularly in thin markets where evidence is very weak. He thus suggests that the role of an expert should be limited to making systematic presentation of the evidence and letting the actors on the market draw conclusions



about what to do-since market value is impossible to know.

### 3.1.2 Open Market Value

'An opinion of the best price at which the sale of an interest in the property would have been completed unconditionally for cash consideration on the date of valuation, assuming:

- a) A willing seller;
- b) That, prior to the date of valuation, there had been a reasonable period (having regard to the nature of the property and state of the market) for the proper marketing of the interest, for the agreement of the price and terms and for the completion of the sale;
- c) That the state of the market, level of values and other circumstances were, on any earlier assumed date of exchange of contracts, the same as on the date of valuation;
- d) That no account is taken of any additional bid by a prospective purchaser with a special interest; and
- e) That both parties to the transaction had acted knowledgeably, prudently and without compulsion. [The Appraisal and Valuation Manual (RICS, 1996)].

The Royal Institution of Chartered Surveyors, in PS 4.1 states that the market value and open market value definitions shown above should result in the same figure.

### 3.2 Valuation Process

**Logical phases of valuation procedure for plant and machinery:-**

Phase I	Terms of reference
Phase II	Strategy of valuation
Phase III	Physical verification (survey and inspection)
Phase IV	Data collection and valuation analysis
Phase V	Reconciliation

### **3.2.1 Phase I - Terms of reference:**

- (i) The source of the instruction;
- (ii) The purpose of the valuation;
- (iii) The date of the valuation;
- (iv) Treatment of items;
  - On lease;
  - On hire purchase;
  - Held in trust;
  - Jigs, patterns, special tooling in machine tool industry, instrumentation, piping and other installations in process industry depending on type of industry under consideration;
  - Fixed plant normally regarded as part of the building services, such as, electrical installations for lighting, sanitary pipings, acoustics, air-conditioners etc.
- (v) Assumptions to be made relating to the basis of valuation;
- (vi) The appropriate instructions, particulars of publication and limit on liability to third parties.

### **3.2.2 Phase II - Strategy of valuation;**

#### **General**

- Valuation of plant and machinery require the preparation of an inventory in the form of a schedule. The extent of details to be included in such schedule is a matter dependent upon the valuer's judgement, after due consideration of client's instructions. However, information on the following points are relevant in the preparation of inventory :
  - description;
  - model, serial number and maker's name;
  - client's own plant reference number;
  - size or capacity;
  - age/year of manufacture/year of installation;
  - reference to any special foundations, service connections, accessories as the case may be:

- modifications, renovations carried out after installation;
- energy consumption;
- environmental and other legal restrictions if any:
- usage;
- record of production and maintenance.
- Each piece of plant and machinery needs to be inspected, as detailed below:
- Check the condition, physical deterioration and wear and tear.
- Check the working environment with regards to following:
  - Is power supply easily accessible?
  - Condition of power cords and other connections.
  - Is power surge protection utilised?
- Check the usage:
  - One shift, two shifts or three shifts per day.
  - Number of hours in one shift.
  - Number of working days in a year.
- Check the maintenance record and ascertain;
  - Is preventive maintenance adopted?
  - Number of complaints received.
  - Are any complaints repeated? How are they attended?
  - Are causes of complaints diagnosed?
  - Quantify the severity of complaints.
  - Whether all complaints are rectified?
  - Past history of breakdown with causes, if any.
- Technical specifications shall be verified from purchase order as well as technical literature available in the maintenance department.
- Depending upon the basis of valuation, the valuer needs to take into account *inter alia* cost of installation, freight, import duties and other fiscal levies, condition and obsolescences.
- Computation of block value shall be made for such components of ancillary and support equipment as they do not admit of individually itemised valuation but require estimates in a generalised manner.

- Inventories or fixed asset/plant registers provided by clients need not be fully relied upon, although they are a useful aid to a valuer in preparing his or her own inventory, and provide assistance in establishing discrepancies, if any, that exists between the book records and assets actually available on the inspection date(s).
- Information volunteered by the client or an employee of., the client need be treated with caution due to possibility-of bias arising out of subjective considerations.
- Certain fixed plants in building services are normally included in the valuation of land and buildings, such as, electrical installations for lighting, piping installations for sanitary purposes, lifts, acoustics etc. Whatever may be the purpose or basis of valuation, valuers are required to be consistent in their treatment of such "fixed plant".
- When different valuers are employed to carry out property and plant valuation for the same assignment careful liaison and co-ordination is necessary to avoid either omissions or double inclusions.
- A valuation of land and buildings will normally take into account those items of plant and machinery which primarily provide services to the land and building and which the open market regards as an integral part of the premises for purposes of letting, sale or loan security. Where such items are valued along with the land and building, they must be excluded from plant and machinery valuation.

**The following items *inter alia* are to be treated as plant and machinery:**

- air-conditioning plant with ducting,
- Electrical installations for plant and machinery
- Water and sewerage installations,
- chimneys to boiler,
- Brick or concrete structures, foundation, and tanks associated with plant,
- Effluent treatment plant,
- Alarm installations.

**The following items *inter alia* are to be treated as land and building:**

- Wells, tube wells, underground tanks, overhead tanks, roads etc.

Valuers are advised to discuss with the company accountants and auditors in appropriate cases before carrying out detailed valuation.

**Particular requirements:**

- Items 'held in trust':
- Detailed scrutiny shall be carried out to establish as to which items are not the property of the client but are 'held in trust'.
- Patterns, jigs, moulds, instrumentation, piping and other installation in process industry etc.:
- As a general rule, press tools, dies, moulds, patterns, jigs, punch cards, tapes, instrumentation, piping and other installation in process industry depending on type of industry under consideration shall be dealt and shown separately from the other items.
- Administration records:
- Administration records or copy rights in the form of design, drawing, etc. shall not form a part of valuation of plant and machinery.
- Computer software :
- The inclusion of computer software in valuations is a matter for special significance in certain cases and it shall be discussed with the client for consideration in this behalf.
- Motor vehicles (licensed for road use):
- These shall be dealt with as separate item in the valuation process.
- Plant and machinery - work in progress:
- These also shall be dealt with as separate item in the valuation process.
- Stocks, materials-in-trade, new stores:
- These are not always to be included in valuation of plant and machinery. There are some projects where this could be requested by the clients for inclusion.

All valuation refers to a particular date. The estimate has to be on the basis that the relevant plant and machinery is ready for commercial production as on date of valuation and, therefore, the time required to bring the plant into commercial production has to be borne in mind, particularly while valuing large plants requiring several years to reach the state of commercial production.

After preparing inventory of the entire plant and keeping in mind parameters given above, the next step will be to physically verify the inventory with asset records maintained by the company.

Generally, companies maintain a fixed asset register which gives itemised details of plant and machinery showing original cost, date of purchase, date of installation, invoice number, name of supplier, identification number etc. However, the fixed asset register maintained by the companies are not often up-to-date. Therefore, it is necessary to compare the inventory with the asset record/fixed asset register maintained by the company to ascertain discrepancy, if any, and it is necessary to adjust the discrepancy in the books of account in order to give a true and fair view (Budhbhatti 1999).

### **3.2.3 Phase III - Physical verification (survey and inspection)**

Accurate description of machinery and equipment is important to be able to attach value or for the manufacturer to be able to identify it and thus be able to give the cost of a similar new machine.

Categorization of identification

- Macro identification
- Micro identification

#### **Macro identification**

It involves studying the entire manufacturing process by identifying major components contributing to the design capacity of the plant (Budhbhatti, 1999).

In particular and according to Okoth, 2003, one looks at:-

- What the plant manufactures or produces
- How the product is manufactured
- What the capacity of the plant is.

*It is easy but can be inaccurate because it cannot detect issues such as over or under design and so may give or arrive at wrong values (over/under valuation).*

A list of information to be considered when gathering the data for macro identification of machinery and equipment include:-

- Date of manufacture
- Company name and address
- Who furnishes the information
- Products produced, with each process name and description
- Engineering design firm and contractor if other than the engineering firm
- Original date of construction and expansions
- Plant/process by products, amounts and uses
- Plant and/or unit capacity per day, tons per day, gallons per day, barrels per day, annual production etc
- Plant capacities: design capacity, rated and actual consistent capacity.
- Yield or losses, reason for losses
- Feedstock's and sources
- Operating mode (days, month) if not identified in capacity.
- Outlets for finished or intermediate products
- Plant sales outside the parent company, for use in other company plants, other product sales possibilities.
- Available historical operational data over three to five years
- Fuel and power consumption by unit
- Operating staff per unit, type of control systems and if the control is centralized.
- Estimated maintenance budgets over the last three to five years and projected upcoming budget if plant is operational.
- Which equipment requires more than routine maintenance and why
- How the maintenance program is conducted, regular, preventive or demand.

- If the plant is modern and operating at total efficiency standards or if the process is obsolete, expandable etc.
- Plant flow, considered adequate, manageable, etc
- General condition of plant and components
- Age: chronological and effective life
- If safety and environmental standards are good (if not, can they be upgraded and at what cost)
- Pollution control equipment in place
- Support facilities
- Obvious detrimental factors

### **Micro Identification**

It is the process of finding the individual characteristics of the equipment (each piece and value it as such), (Budhbhatti 1999).

The total value is arrived by summing up the individual values. This enables one to identify the peculiarities of each piece for example capacities, mode of installation, materials used to manufacture, ages, working conditions....

**It is more accurate, involving but, generally preferred.**

According to Alico, 1989, the following information are gathered in this type of identification;-

- Machine type-pump, tank, dryer, evaporator, air compressor, centrifuge, homogenizer, cooling tank...;
- Manufacturer, model and serial number;
- Size/capacity and materials of construction;
- Auxiliary equipment-support/work in conjunction with main equipment;
- Type of drive-whether prime mover, electric motor, fuel engine;
- The control system-automatic or manual;
- Special foundation, plumbing and platforms.



It is important when recording the initial inspection that the details be observed. As an appraiser's experience grows so does the ease in gathering data. Information can be refined after the appraiser has all the facts.

Appraisers are professional data gatherers. They are interested observers and good investigators. A professional appraiser is not intimidated by the lack of precise knowledge of the process or the machine. If the data are good, they will be understood by novice and expert alike.

There are various methods of valuation under the three basic approaches to value e.g., cost, market and income. In this chapter, data collection for the following methods are discussed:

- Replacement cost new (depreciated replacement cost)
- Sales comparison
- Capitalised income

#### **3.2.4 Phase IV - Data collection and valuation analysis**

Replacement cost new:

Steps to be followed to arrive at final value are as under:

- (a) Ascertaining replacement cost new
- (b) Calculating depreciation and obsolescences

The difference of (a) and (b) indicates depreciated replacement cost:

The method is not as simple as it appears because of non-availability of proper data for ascertaining replacement cost new, economic life and depreciation.

Replacement cost new can be ascertained by any one of the following two methods:

- By floating inquiry
- By applying price index to historical/original cost.

Replacement cost new calculated by floating inquiry and getting the quotation from the supplier is very accurate. For this, it is necessary to provide proper technical specifications to the supplier. This can only be achieved by obtaining the following vital data from the clients -

- Technical specifications mentioned in the purchase order.
- Technical specifications from the maintenance/engineering department.

It is also pertinent to point out that getting the quotation from the supplier is very time-consuming and clients are generally in a hurry.

The other method resorted to is applying a price index to the historical/original cost (trending the historical/original cost).

Historical cost itself is not likely to be accurate for the following reasons:

- It is inflated to reduce the margin at the time of obtaining a loan for purchase of plant and machinery or possibly some other reason.
- It can be deflated because a purchase consideration was not fully reflected due to variety of reasons.

#### **Additional care to be taken in applying a price index:**

- Many a time a second-hand machine is purchased for which first original cost (historical cost) is not available. In such cases, it is advisable to obtain a quotation.
- Machine purchased in a particular accounting year remained under capital work in progress for more than one year and capitalised in a subsequent year of accounting. In order to calculate replacement cost new in such cases, price Index for the respective years of purchase to be applied to the historical costs and not to the year of capitalisation.
- In case of imported machine extra care is to be taken, due to following factors:-
  - Difference in price index of country of origin to machine and location to machine.
  - Difference in rate of custom duty at the time of purchase and valuation.

-Difference in currency rate at the time of purchase and valuation.

In such a case price index of country of origin is to be applied to purchase price in foreign currency of machine under consideration, this will give trended cost in foreign currency; to this, currency rate and custom duty prevailing as on valuation date are to be applied to arrive at Reproduction Cost New.

In actual practice, there is a lot of dependence on price indices published by the Reserve Bank of India; Department of Economic Affairs, Govt. of India; Her Majesty's Stationary Office, U.K. etc.

If the price indices are available in the following manner, they are more reliable

- The machine price index prepared by obtaining the price year from various manufacturers will give a proper price index
- Valuers having their own data bank can present a credible and quantifiable valuation

After ascertaining replacement cost new, the next step is to calculate the depreciation and if obsolescence is present, the same needs to be computed appropriately

Valuers have to encounter machines falling under following broad categories in actual price.

- (a) Machines identical to the machine under consideration as available in the market from the original manufacturing.
- (b) Machines discontinued by the original manufacturer machines manufactured by different manufacturers.
- (c) Old and outdated machines discontinued by the manufacturer

Considering the machines falling under category (a) as referred above,  
In the case of these machines it is not difficult to ascertain cost and depreciation may be calculated from the following

- Age - chronological or effective
- Usage
- Estimated economic balance life. The best way to establish economic life of an equipment is to go through the records of plant under consideration and collect the information about the machine scrapped or retired by the company, and study the same. However, this is possible only in case of old plant

Machines falling under category (b) as referred above

Many a time, it is observed that the same machine manufacturers are sold at different prices.

The reasons for the difference can be:

- Brand name
- Better quality
- Percentage of rejection
- Down time
- Maintenance cost.

If the products of the manufacturer other than the original manufacturer are well comparable with the original manufacturer; replacement cost for a manufacturer other than the original manufacturer can be accepted. Otherwise, adjustments will have to be made with good judgments as there is no empirical formulae to provide the right answer. This is known as replacement in like kind and utility.

Machines falling under category (c) as referred on previous page.

In case of machines falling under category (c) it is necessary to calculate obsolescence and for that purpose it will be necessary to carry out the comparison of machine under consideration with the latest available machine with regard to following factors:

- technical specifications;
- direct wages;
- consumption of stores and space;
- consumption of energy;
- fixed cost;

- saving in space;
- down time.

### **Summary of valuation for depreciated replacement cost**

- (a) Replacement cost new estimated from the quotation  
or  
Reproduction cost new obtained by applying price index to  
historical/original cost less
- (b) Physical depreciation and obsolescence, if any, is equal to depreciated  
replacement cost

### **Data collection and valuation analysis: Sales Comparison Method**

Details of machines sold by the company are obtained from the accounts department in the following format:

- Description with complete technical specifications;
- Date of purchase;
- Date of installation;
- Purchase price;
- Date of sale;
- Condition of sale;
- Condition (physical) of item at the time of sale.

The above information helps in arriving at the following parameters:

- Ascertaining remaining life
- Establishing value of similar machines under consideration.

It is likely that sufficiently similar machines may not be available and there may be different manufacturers. However, the prices can be used as a 'guideline' for arriving at value of more or less comparable machines with appropriate adjustments. Information on the following items is necessary for plant and, machinery under consideration:

- Description with complete technical specifications
- Date of purchase

- Date of installation
- Manufacturer and country of its origin.
- Purchase price
- Sale price
- Date of sale
- Condition of machine at the time of sale
- Terms and conditions of sale
- Any renovation/remodeling/upgradation carried out after installation so as to increase output etc.

It is likely that there may be machines which have dissimilarity with regard to manufacturers. By using specifications of comparative models as manufactured by various manufacturers a guideline for comparison may be worked out.

It is also advisable to get information from reliable dealers of secondhand machines, or from privately created data bases.

It will be necessary to make adjustments to a sale price obtained as well as on information available from other sources. Because hardly any two identical machines are sold satisfying all conditions. Normally adjustments are required to be made on the following points:

- Year of manufacture
- Technical specifications and name of manufacturer
- Time of sale and date of valuation
- Market conditions at the time of sale and date of valuation
- Location of actual sale and subject machine
- Condition of the machine sold and condition of subject machine sold with accessories or without accessories.
- Terms and conditions of sale to ascertain whether it was a freesale or not.

### **3.2.5 Report writing and presentation**

Because of the wide range of manufacturing and service industries and the diversity of assets employed in the various industrial sectors, the specialist plant and machinery

valuer is required to develop knowledge of plant and machinery in breadth rather than in depth; however, the various bases of valuation, their application and the underlying philosophy exactly match those adopted by the land and building valuation fraternity.

### **3.2.6 Subject matter of the valuation**

When considering the aims and methodology of plant and machinery valuation, the first question which must be addressed is, quite simply, 'What is meant by plant and machinery?' Basically, all tangible assets in a commercial or industrial undertaking will be considered to be plant and machinery with the exception of the land and buildings and current assets (i.e., stocks, stores, work-in-progress, etc).

The precise content of a plant and machinery valuation will vary according to the purpose for which the valuation is required. Ensuring that the exact content of an appraisal is right is not always given the attention which it deserves and errors in establishing the schedule of assets can lead to far greater inaccuracies than mistakes made later on in the valuation process.

There are three principal types of valuation, namely:

- (i) Insurance
- (ii) Financial
- (iii) Open market.

Although the definition of plant and machinery remains constant for all three types of appraisal, the assets which actually have to be taken into account for each valuation category can vary substantially.

Insurance valuations are considered first, since these are the most straightforward appraisals and they generally have a broader content than other types of valuation. In general, insurance valuations take account of all contents within the premises in question with the exception of current assets and items in the nature of building services and landlord's fixtures and fittings. The only other items on site which may have to be

excluded from the valuation will be assets that are separately insured by some specific policy.

The actual wording found on an insurance policy which must, necessarily, dictate the content of the valuation will probably be a close variation on the following: 'On plant, machinery and all other contents, the property of the insured or held by them in trust, for which they are responsible (excluding landlord's fixtures and fittings, stock and materials-in-trade)'. An examination of this wording will show that all assets except the buildings themselves and the specific exclusions must, by default, fall into the category of plant, machinery and all other contents.

As with all types of valuation, in order to avoid misunderstanding, duplication or omission, liaison with the client, the insurance broker and the building surveyor is essential.

According to RICS Statement of Assets Valuation Practice No. 16 and Chapter 8 of the ISVA Blue Book, all production machinery and manufacturing plant will fall into the category of plant and machinery; however, there are many other items which must be taken into account and which, collectively, will often have a greater value than the production plant. These will include:

- machine ancillaries
- hand tools and inspection equipment
- works fixtures and fittings
- items held on trust and on hire
- plant services
- internal transport
- electric power distribution installations
- office, canteen and laboratory equipment and furniture
- equipment in yards and off site
- 'other contents'.



The term 'other contents' has a special meaning in insurance industry terminology and includes such items as cash, stamps, directors' and employees' personal effects, reconstituting administration and computer records, special tooling, jigs, fixtures, moulds, dies and similar product-dedicated items.

Items specifically insured by other policies can generally be excluded from the principal insurance valuation; however, care should be taken to ensure that a specific insurance policy extends to cover the risk for which the principal valuation is being prepared.

The content of a financial valuation will be different from that of an insurance appraisal. This subject is considered in RICS Statement of Asset Valuation Practice No. 16 and Chapter 8 of the ISVA Blue Book.

Production machinery, ancillaries, plant services, works and office equipment should be included in a financial valuation in precisely the same way that they would be included in an insurance appraisal. However, items belonging to a third party should be excluded (irrespective of where insurance liability lies), as will product-dedicated items such as moulds, jigs, press tools and other assets which fall into the 'other contents' category for insurance purposes.

The principal differences between the contents of insurance and financial valuations are shown in the table overleaf.

Special consideration should be given to items held under the terms of lease agreements. This matter is briefly considered in RICS and ISVA plant and machinery guidance notes and more fully covered in Statement of Asset Valuation Practice No. 21 published by the Institute of Chartered Accountants in England and Wales. In general, items which are subject to operating leases are excluded from the valuation, whereas items held under the terms of finance lease agreements should be taken into account.

Once again, liaison with the client and property surveyor at the outset of an appraisal is essential to avoid the possibility of duplication or omission. The classification of items in the nature of building services between (i) land and buildings and (ii) plant and machinery can be a little hazy. However, this matter is dealt with in some depth in RICS

Information Paper No. 6, Plant and Machinery Normally Included in Valuations of Land and Buildings (3rd Edn. 8/90).

**3.2.7 Similarities and differences between the content of financial valuations and insurance valuations:-**

<b>Item</b>	<b>Financial</b>	<b>Insurance</b>
Principal machines and ancillaries	In	In
'All other contents'	Out	In
Product dedicated items	Out	As directed
'Borderline' cases	As directed	Out
Specifically insured items	In	Out
Stocks and stores	Out	Out
Building services	Out	As appropriate
Equipment off site	In	In
'Add ons'	Out	In
Loaned, rented and hired assets	Out	In
Leased assets	As appropriate	In

**Key:** In – Include; Out – Exclude.

The content of an open market valuation will be as directed by the client and may include simply a single machine or a package of machinery or the entire contents of a factory.

Where all the assets within the property have to be taken into account, the subject matter of the valuation can vary according to the future plans for the building itself. For example, if the factory is to be sold for further occupation, then overhead cranes, power distribution and heating installations, mezzanine floors and other items with a high installation content would probably remain in situ, whereas if the building is to be demolished, it is likely that every single item which could be sold for cash would be offered for sale along with the production machinery and other equipment.

## 3.2.8 Valuation techniques

### 3.2.8.1 Insurance valuations

Once again, it is preferable to consider these first since these are the most simple type of appraisal and establishing reinstatement with new insurance values is very similar to calculating gross current replacement costs for financial appraisals. The required basis of valuation is virtually always reinstatement with new, i.e. new for old.

The basic valuation technique is to establish the current new price of an identical or broadly similar asset and allow for transportation, installation and commissioning costs. In the case of larger machines and continuous production installations, these additional costs are likely to include civil engineering works and professional consultants' fees.

Even in the case of relatively standard items, such as proprietary machine tools, the valuation is not necessarily confined to a simple reference to a price list or a call to the manufacturer. It is essential that the valuer recognises which equipment on the machine is standard issue and which items were supplied at extra cost.

By way of example, a standard screw cutting lathe may well be supplied with three jaw chuck, four jaw chuck, face plate, coolant pump and splash guard as standard. However, it is incumbent upon the valuer to recognise that the high speed threading attachment, quick change tool post, hydraulic copying attachment and additional four jaw chuck would be extra cost items and it is not uncommon to find that non-standard items attached to a machine tool will add 30 per cent or more to the basic machine cost. To confuse the issue further, some additional cost items specified prior to the machine being made may well be built in to the inner workings and not be immediately obvious from a cursory external inspection.

Where machines similar to the item in question are no longer available or where the current versions incorporate considerable betterment when compared with the existing unit, it will be necessary to make due adjustment in respect of obsolescence. In

practice, this can be a complex problem requiring consultation with the client and the insurance broker.

The valuation of special purpose machines and equipment custom-made by the client also requires particular consideration.

As previously stated, all 'other contents' in insurance terminology refers to

- money and stamps;
- documents, manuscripts and business books;
- computer systems and records;
- patterns, moulds, plans, designs etc;
- personal effects of directors, employees and visitors.

For all these items, the basis of valuation will be the cost of replacing those items which the client would wish to replace in the event of loss or damage by an insured peril. Items which the client would not expect to replace need not be taken into account and this would not increase exposure to the risk of the application of the condition of average due to under-insurance. Equipment off site such as moulds and patterns at sub-contractors' premises may have to be included under policy extensions where they are not insured by the sub-contractor. This subject often requires extensive investigation.

Once the insurance valuation of tangible assets and 'other contents' has been completed, allowance should be made for demolition and debris removal costs and any additional expenditure which may necessarily be incurred as a result of the necessity to comply with the requirements of public authorities.

Valuations are generally reported on a 'day one' basis with no provision made for increases in costs which may occur as the result of inflation during the currency of the present insurance period or during the indemnity period following loss or damage by an insured peril.

Insurance valuations are occasionally prepared on the basis of indemnity; usually in instances where the facility is old or obsolete and it is improbable that the client would replace the existing assets in the event of serious loss or damage. Unlike reinstatement with new valuations where the insurer will only pay for repairs and replacement equipment, an indemnity settlement is a cash payout. Essentially, an indemnity valuation endeavours to calculate the present monetary worth of the assets; therefore due allowance should be made for age, wear and tear. The valuation technique involved is basically a depreciated replacement cost calculation similar to that described later for financial valuations. However, depreciation rates adopted for indemnity insurance valuations can be considerably more contentious than those utilised for financial appraisals!

### **3.2.8.2 Financial valuations**

Financial valuations are required for the following:

- company accounts and other financial statements
- merger and takeover;
- takeover defence;
- floatation;
- buy-outs and buy-ins;
- privatization;
- performance and product cost analysis;
- receivership and administration.

The required basis of value is 'value to the business' or 'existing use value'. These are interchangeable terms which are defined in the RICS Statement of Asset Valuation Practice No. 16 as 'the value on the assumption that the plant and machinery will continue in its present existing use in the business of the company'. SAVP 16 further states that the value to the business of plant and equipment is defined as the lower of (a) the current replacement cost, or (b) the recoverable amount.

It can be seen from the above definition that calculating existing use value is essentially a two-stage process, i.e., first establish the gross current replacement cost and then

depreciate in the light of age and condition in order to reflect the value attributable to the remaining economic working life by reference to current costs. The ultimate objective of an existing use valuation is to calculate the value attributable to the remaining production capacity or service potential offered by each and every asset as it forms part of the complete integrated package. Although the valuation is based on historical evidence such as original date of purchase and service provided to date, the appraisal is, essentially, seeking to look forward and envisage what benefit the company can derive from each asset in the future.

The starting point for a depreciated replacement cost (DRC) calculation is gross current replacement cost which is broadly similar to reinstatement with new insurance value already considered, although in view of the different objectives of the two types of appraisal, the adjustment for obsolescence may have to be approached in a different manner. This is a fairly complicated technical matter which need not be considered in this paper.

Depreciation of the gross current replacement cost should take account of the following:

- total anticipated working life;
- age;
- condition;
- standard of maintenance;
- workload;
- replacement of component parts;
- reconditioning and refurbishment;
- residual value at the end of working life;
- interdependency with other machinery;
- overriding economic factors.

It is essential to cross-reference DRC valuations to market evidence where this exists. Failure to do this can result in major inaccuracies with particular risk of under valuation, even in the present depressed market where secondhand prices for certain machines are still comparatively high.

Recoverable amount is the value attributable to the anticipated future use of an asset in the business of the company, together with its net realisable value upon disposal. Recoverable amount will be the appropriate existing use value where it can be seen that this level of value has permanently fallen below the DRC value. This situation is most commonly found where a machine or production facility is nearing the end of its working life and decommissioning and removal is probable in the near future. In many instances, decommissioning and dismantling costs necessarily incurred in the removal of the plant at the end of its working life can result in negative values. This situation often occurs when production plant (particularly chemical plant) has to be removed with high demolition and site reinstatement costs and very low salvage values.

In calculating the existing use value of plant and machinery, it is essential that the valuer recognises that the object of the appraisal is to establish the worth of the entire production unit rather than the individual assets which make up the facility; therefore, the compatibility of the various items of machinery, plant layout, suitability of the property and other factors which may affect production efficiency must be taken into account. Generally speaking, this can only be dealt with globally rather than on an item-by-item basis. Value can also be affected if the property is held on a limited tenure or the operation is based on finite resources (e.g., limited clay reserves at a brickworks)

### **3.2.8.3 Open market valuations**

Open market valuations probably represent the greatest challenge to the plant and machinery valuer. Estimates of open market value can only be based upon evidence of transactions. The balance between supply and demand in the various sectors of industry can be extremely variable, with major fluctuations in realisable values occurring within a narrow time frame.

Sources of evidence available to the valuer include:

- auction sale results;
- machinery dealers' advertisements;
- classified advertisements in trade journals;
- the 'jungle telegraph'.

According to Alico (1989), 'Open market value' is a generic term and, in reality, it covers several specific tiers of worth which are, inter alia,

- Orderly sale value of the assets as a whole to remain in situ.
- Orderly sale value of the assets as a whole for removal.
- Orderly piecemeal sale value of the assets.
- Forced sale value of the assets as a whole to remain in situ or for removal.
- Forced sale value of the assets for piecemeal disposal.

'Forced sale value' is a much misused term. Disposal by auction or tender may well be the preferred method of sale adopted by a trader to create profit. As such, this is clearly not a forced sale disposal - and yet, many surveyors still refer to the anticipated realisation of such sales as 'forced sale'. The sole criterion which dictates whether a value is a forced sale value or not is simply a reflection of the time available for completing the disposal. If a sale has to be effected during a time-scale which cannot be considered reasonable bearing in mind the nature of plant and the state of the market, forced sale conditions will prevail. If the time available can be considered reasonable, a forced sale valuation would not be appropriate irrespective of the method of disposal chosen.

The realisation achieved by specific assets can vary considerably according to the nature of disposal. A single machine sold on behalf of a receiver with a time limit, perhaps due to the requirement to vacate the premises within two or three weeks at the termination of the lease can be radically different from the realisation achieved by an identical machine which is offered as part of a large, attractive and well supported auction sale properly marketed over an appropriate period of time with a suitable budget. Clearly, the size and nature of disposal which the valuer envisages at the time of the appraisal can have a profound effect on levels of value.

#### **3.2.8.4 Future residual valuations**

A development of open market valuation which has been very much in demand in recent months is the forecasting of future residual values for banks who specialise in asset based lending and operating leases. This type of valuation is often (but not always) confined to a relatively small number of 'big tickets' assets, both new and



secondhand. In many instances, these valuations and forecasts of future residual worth have to be undertaken without an inspection of the assets - perhaps because a deal has not been concluded or simply because the item in question is still under construction.

Particular points which the valuer must investigate include establishing whether or not all available discounts are shown in the invoice and if the quoted prices include transportation, installation, commissioning and training costs which are almost always totally irrecoverable upon the resale of the machine.

The content of valuation reports is considered in the RICS and ISVA Guidance Notes. However, these do not consider reports for future residual valuations where additional caveats are required to explain the specific scenarios which have been envisaged, since it can be considered to be well outside the scope of a plant and machinery valuer to attempt to forecast technological and political developments which may have a profound effect on future residual value.

## CHAPTER FOUR

### DATA ANALYSIS AND PRESENTATION

#### 4.0 Data Collection and Analysis

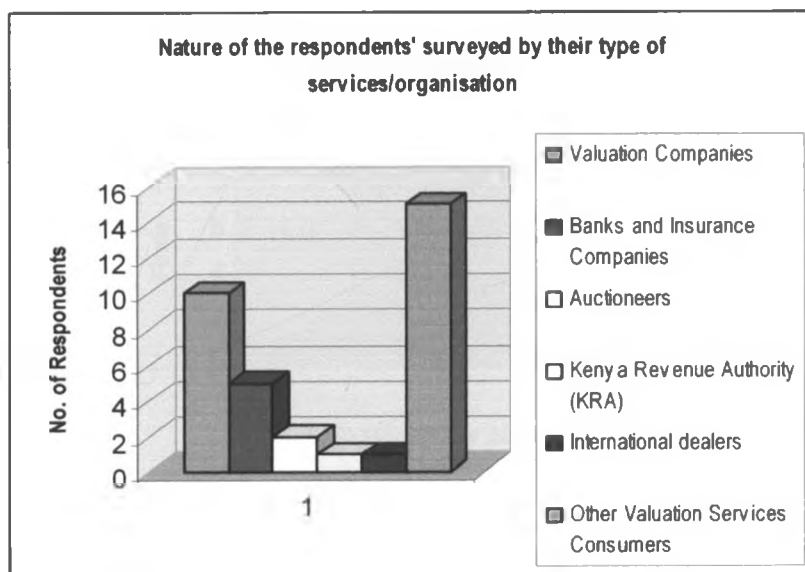
##### 4.1 Introduction

In Kenya they are currently 269 full registered valuers as at 13<sup>th</sup> March, 2009 (Kenya Gazette Notice No. 2605). Valuers are registered by Valuers Registration Board in accordance to The Valuers Act Cap 532 Laws of Kenya. For one to be registered as a valuer s/he must have undergone rigours training. The requirements are: (a) to be a member of the Institute of Surveyors of Kenya (Valuers Chapter); or (b) a corporate member of the Royal Institution of Chartered Surveyors (in the General Practice or Land Agency or Agriculture Sections) and is qualified to be or is a member of the Institution of the Surveyors of Kenya (Valuers Chapter); or (c) the holder of a degree or diploma from any university or college which is recognized for the time being by the Board and qualifies him to be a member of the Institution of Surveyors of Kenya (Valuers Chapter). (2) Notwithstanding the fact that he has sufficient qualifications under Subsections (1), the Board may require an applicant for registration under this Act as a valuer to satisfy it of such that, in the opinion of the board, he is a fit and proper person to be registered under this Act and the Board may direct the registrar to postpone the registration of an applicant until it is satisfied.

Data collection was carried out by administering questionnaires for analysis in this project. The questionnaires aimed at finding out how plant and machinery valuation is handled, what methodology/approach is applied and its implication to the values arrived at, who carries out the valuation and the satisfaction level by the consumers in Kenya.

Of the 50 questionnaires which were administered, 37 were returned, giving a response rate of 74%. The in-person survey (IPU) did not achieve high sample since only 10 large valuation companies, 10 major valuation services consumers, Kenya Revenue Authority (KRA), a second-hand and new international machine dealer in Germany, 8 Auctioneers and 20 other minor valuations services consumers were approached by the interviewer. However, it had high response rate of 74% or 37 full questionnaires.

The main reason for the high response rate was perhaps the interviewer was a professional colleague and an official of Valuation and Estate Management Chapter (VEMS) of ISK and thus majority of respondents have had earlier interaction in the field. The replies ranged from selected large valuation companies in Kenya, an International Centre for second hand and new machinery dealer in Germany – Europe. Major Valuation service consumers (banks and insurance companies), Auctioneers, Kenya Revenue Authorities (KRA) and other minor valuation services consumers. The breakdown of the categories targeted is shown below in Graph 4.1.1



**Graph 4.1.1: Questionnaire respondent by type of organization/service**

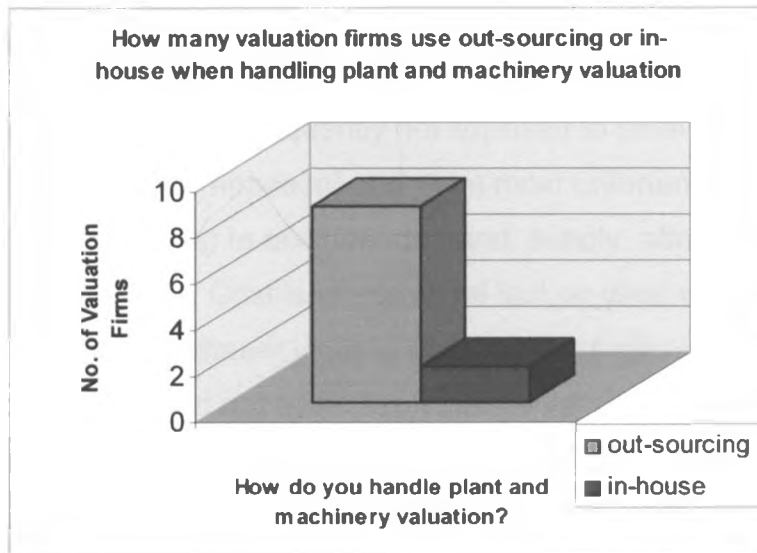
Each question asked in the survey was analysed as a whole in this section, looking at indications of how plant and machinery valuation is handled. The respondents are split up for the purposes of analysis into service providers (valuation), consumers (major and other services), Kenya Revenue Authority (KRA), auctioneers and second-hand machine dealer to examine how and whether the service consumers are satisfied and how improvements can be done to enhance a more justifiable value opinion.

A list of responding entities included in the data analysis can be found in Appendix 2 while a copy of the questionnaire can be seen in Appendices 3.

#### 4.1.2 Plant and Machinery Valuation information

This section looks at how valuation companies approach plant and machinery assignments, who handles the exercise, the approach / methodology applied together with its justification and the need(s) for training.

#### 4.1.3 How valuation companies handle plant and machinery valuation



**Graph 4.1.3: How valuation firms handle plant and machinery valuation results**

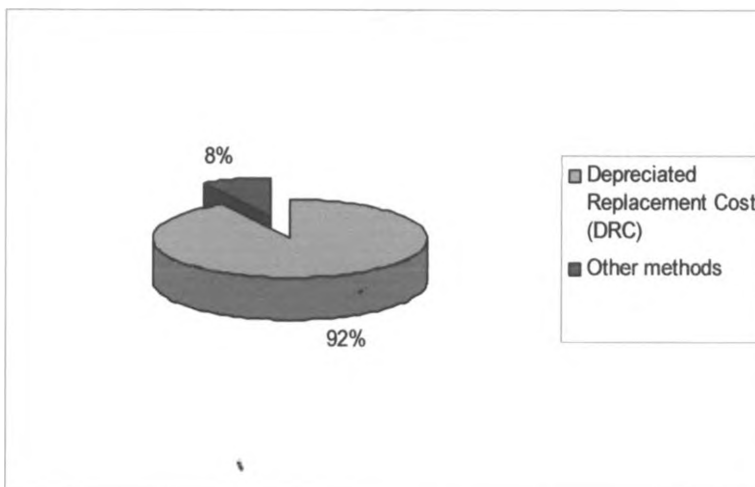
As can be seen in Graph 4.1.3 a larger portion of valuation firms (90%) outsource valuation of plant and machinery and only 10% handle it in-house. Of the valuation firm(s) not outsourcing this service, it was commented that property Valuer's with Land Economic background lack proper orientation after graduation. It was also observed that majority of the firms have not been handling this area and consequently fresh graduate when exposed to industry they adopt the norm of those who are training them. Unfortunately it was remarked and as a matter of fact that majority of Kenyan valuers are product of at least two (2 No.) major pioneer firms in Kenya. The overall attendant effect of lack of exposure on plant and machinery valuation has led to the current situation where by even simple valuation assignments involving agricultural machinery (in spite valuers have been trained in agricultural valuation and even some with

specialized training in Agricultural machinery valuation) have always been outsourced to engineer.

#### 4.1.4 Valuation approach /methodology applicable

Of the 90% of firms that outsource valuation of Plant and machinery, 100% engage the services of an Engineer. 40% of the firms' respondents emphasized the need of a registered engineer noting the aspect of shared professional responsibility. Engineers are well trained in different aspects of plant and machinery and play a very crucial role on inspection and identification. However and unfortunately, they are only trained in one method i.e cost approach and consequently not exposed to other possible valuation methods (income and sales comparison) and even most unfortunately other value determinants e,g issues relating to taxation ,demand, supply. effects of finite materials on a given industrial setup etc. Cost is an historical fact on what was paid for a given machine or what should a purchaser incur to install an equivalent in case of replacement new and this need not necessarily be the value. The prevailing economic circumstances plays a major role in determination of value and thus a major shortcoming in what as been frequently returned by engineers as values.

#### 4.1.5 Valuation approaches /methodology applicable in valuation of Plant and Machinery

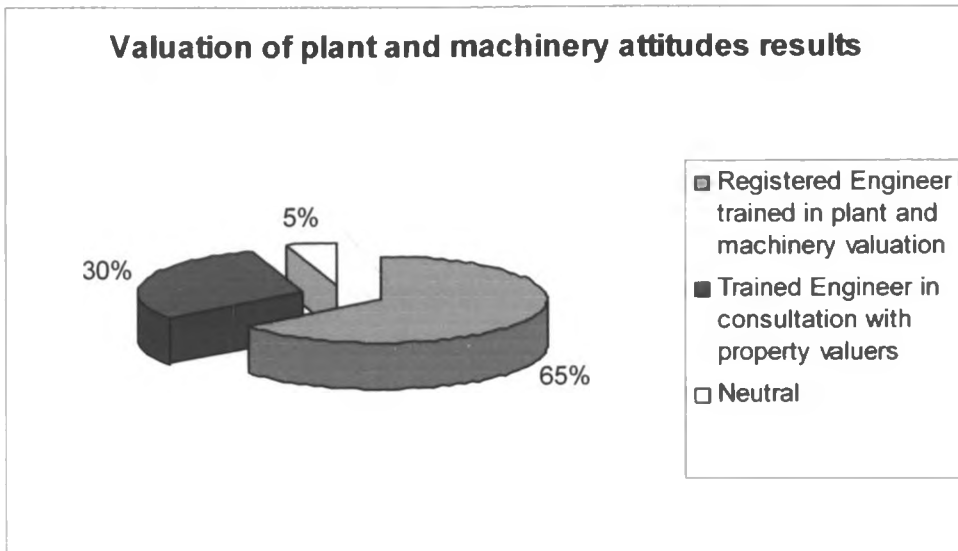


**Graph 4.1.5: Valuation approaches results**

Graph 4.1.5 shows the valuation approaches/ methods applied to valuation of plant and machinery in Kenya by valuation companies. All the companies surveyed used same method of valuation. While the majority (92%) used Depreciated Replacement Cost approach, the other (8%) stated that Sales Approach is applicable depending on the nature of valued plant and machinery and availability of suitable comparables. Depreciated Replacement Cost as a method of valuation is considered by many valuers/engineers (92%) to be the most reliable and the approach that gives a justifiable value opinion. However, the method applicable depends on the purpose of valuation. Engineers are trained on application of cost method. All valuation companies (100%) used cost approach. The method, as described by one engineer seems to be the only best method suitable for the exercise this collaborate Rand, (1986) and, in addition it is the simplest compared to others. However, limitations in this method include the difficulties involved in quantification of depreciation, the subjectivity of the depreciation estimates (Shenkel, 1978) and the fact that cost based valuations do not respond to changes in the way that values change in the market.

It was noted that a look at the income approach in case of a whole entity valuation would give some indication on value particularly where the entity is profit making and more importantly if the plant is fairly new. However, and according to the study undertaken by Greenwell and Co. (1996), the implicit assumptions to argue explicit assumptions about future trends of rent, inflation, cost of capital etc. raises concern on the credibility of the method.(Trott, 1986). A suggestion on the method would be application of the discounted cash flow method [(Greaves, (1972) and Baum, (1973)].

#### 4.1.6 Valuation of plant and machinery attitudes and opinion



**Graph 4.1.6 Valuation of plant and machinery attitudes results**

This part of the survey was to find out the expertise available in the market and investigate on actually who should handle plant and machinery valuations. The respondents were asked to state how they thought about plant and machinery valuation being handled by different practitioners with different backgrounds.

- (i) "Plant and machinery cannot be valued by a Land Economist",
- (ii) "Plant and machinery valuation should be handled by engineers"
- (iii) "Plant and machinery should not be valued by a Land Economist"
- (iv) "Plant and machinery valuation should not be handled by engineers"
- (v) "Am comfortable when Plant and Machinery is handled by technicians"
- (vi) "Technicians provide reliable Plant and machinery Valuations"
- (vii) "Engineers should be trained in Plant and Machinery valuation".
- (viii) "Any Engineer can handle Plant and Machinery Valuations"
- (ix) "Only Engineers trained in Plant and Machinery Valuations should handle valuation work".

Of the surveys which were returned, 9 answers to those statements were usable for analysis. A calculation was made of the ratings in order to show the overall opinion given in the answers and these results are displayed as agree, neutral or disagree.

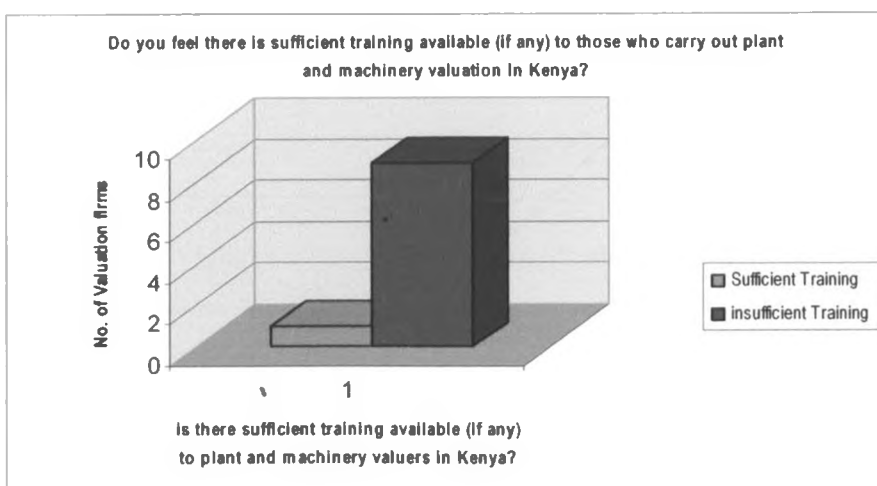
As discussed in the literature review, plant and machinery elsewhere is basically the domain of Engineers. The questionnaire results shows that 65% of those surveyed had a concurrent view to this, that plant and machinery should be valued by a registered engineer trained in plant and machinery valuation. This is also supported by 30% who commented that only registered and trained engineers in plant and machinery valuation should handle the exercise but insisted the need of involvement of property valuers observing that trained engineers are experts in ascertaining the cost component of plant and machinery and not the value.

Cost not being value, the need of buyers' opinion and market considerations must be incorporated to arrive at fair value opinion. In addition, depending on the purpose of valuation for example mortgage, land and buildings forms a major component which cannot be ignored and Engineers cannot value these. 5% of the respondents were neutral on who should handle valuation of plant and machinery and remarked the need for a "specialist" to be trained specifically on valuation of plant and machinery with strong background not only to engineering but also economics, law, environment etc.

#### 4.1.7 Plant and Machinery Training

This section looks at the training aspect on plant and machinery valuation a factor which may have an effect on the manner to which the exercise is handled.

**Graph 4.1.7 Plant and Machinery Valuation Training**



**Graph 4.1.7 Training Results**



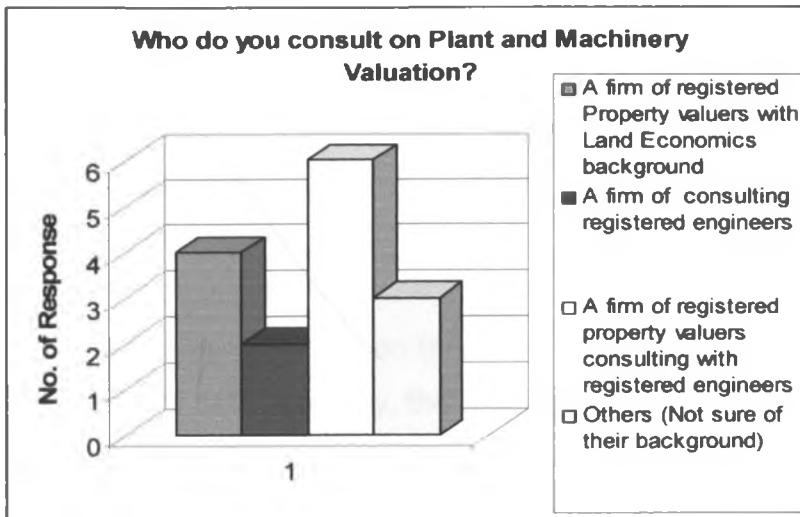
As can be seen in graph 4.1.7 the majority of surveyed respondents considered there to be insufficient training available for the effective plant and machinery valuation in Kenya. Only 10% stated that the training is sufficient but what lacks is proper orientation in the field implying that, if graduate valuer trainees are engaged in firms involved in plant and machinery valuations, then over time they get to learn the exercise and eventually become experts. The author, who is an active property valuer with some basic training in plant and machinery valuation, was of the view that there is virtually no training in plant and machinery valuation at undergraduate level; and even at masters there is dire need to restructure the entire unit and even possibly consider allocation of more time.

**4.1.8 Valuation Services Consumers (Banks)**

The banks were asked on who they consult for valuation services on plant and machinery. On who handles plant and machinery valuations, response were given in the table and graph below.

**Table 1. Plant and machinery consultants from consumer (Banks)**

<b>Plant and machinery “Valuers”</b>	<b>Number of response</b>
A firm of registered Property valuers with Land Economics background	4
A firm of consulting registered engineers	2
A firm of registered property valuers consulting with registered engineers	6
Others (Not sure of their background)	3
<b>Total</b>	<b>15</b>



**Graph 4.1.8 Results on consultants by banks**

The respondents comprising different local and international banks had different explanation on their choices. However, majority had a common view to the fact that in all cases the property was generally charged in totality (all immovable assets) including land, buildings, plant and machinery, and consequently the valuers in various banks panels majority who are Real Estate valuers with Land Economic background valued the property.

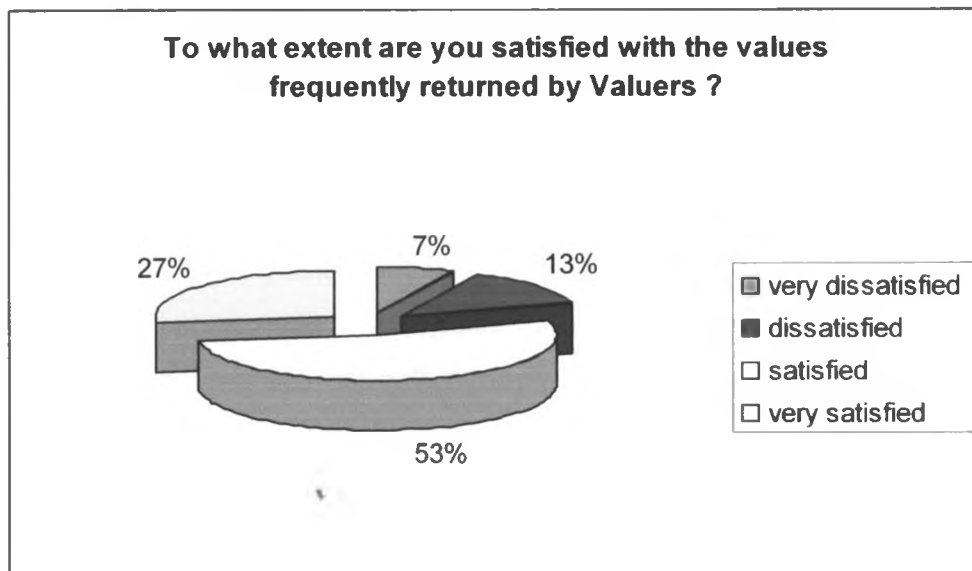
An observation by one major international bank noted of their tendency to peruse the composition of valuation firms team and confided that those with a registered Engineer as a specialist consultant benefited from major assignments involving complex plant and machinery valuation. Interestingly enough, it was observed that for plant and machinery assignments property valuers have been doing a commendable work. Our further investigation over the observation revealed that the "Property Valuation Firms" had their own consulting registered engineers to whom they referred all their plant and machinery assignments. This was collaborated by our research on valuation services providers and also the tendency of Sec & M Co. Ltd to which I am a Director to engage the services of a Registered and Consulting Engineer trained in valuation of plant and machinery.

On whether financial institutions have had instances of over valuation, only 15% stated they thought there instances of over valuation but it was evidently hard to prove as each

of the three valuation firms consulted had its value opinion with a range of 25% difference. It was commented that whether the property was also undervalued it was extremely hard to detect, owing to the fact that in case of mortgage valuations banks normally take more precautionary measures by giving a very conservative lending rate say, 70% of the open market value.

To compound the problem the valuers often tend to return very conservative figures and, even further, in case of debt recovery, the reserve price is very low due to complexity of the subject of valuation and other intricacies which must be considered by valuers. Forced liquidation values generally reported by the auctioneers rarely exceeds the reserve price. A very interesting observation was made by one of the banks to the effect that their auctioneers always returned the reserve price which seldom exceeded with a small margin just to cater for their perceived auctioneering expenses. It was commented that whether plant and machinery are over or undervalued is only the auctioneers who knows the truth.

Whether banks were satisfied with the values returned by the consultants (valuers, engineers or valuers consulting with registered engineers trained in plant and machinery valuation), the response was as follows:



**Graph No. 4.1.9 Results on the level of satisfaction on values**

From the analysis above, 80% of the banks are satisfied with values returned by practitioners. Of 20% dissatisfied with the services our investigations over the issue revealed that they (banks) have a tendency for either demanding valuation reports in a very short period and even to some extent imposing and dictating the fees payable a factor which might have led to shoddy report. A closer look to the letters of engagement to valuers of some of the complainants revealed unclear and unspecific categorization of required values. The instructions are not simply clear and precise on the purpose of valuation. For example "... please provide the bank with valuation of the above referenced factory premises urgently..." What kind of valuation? and for what purpose should a valuer respond to. There is need for definite and clear instructions from the client.

On how plant and machinery valuation is approached by the dealers in Europe, (Germany) it was revealed that age and condition of a machine forms a key component in market value determination. They observed the need for a valuer to critically and carefully judge the machines expected future life and utility. From our discussion, it was deduced that the expected future life should always be added to the age of machine. Therefore, age plus estimated expected future life become the total life of the machine and thus concluded that the use of the ratio:  $\text{expected future life} / (\text{age} + \text{E.F.L.})$  would give a current market value.

Other factors particularly when a valuer comes across units such as (i) The unit is sick (ii) there are no buyers (iii) a few buyers wish to buy it as a distress sale for and, (iv) the unit is not in operation, then a valuer has to go into the factors leading to the present condition of the unit carefully and analyse the situation critically. Factors like technical potentiality for useful production, the aspects of functional and economic obsolescence, the economic usefulness to a prospective purchase should be thoroughly gone into other aspects to consider are, financial bankruptcy, management lapses, technical incompetence in learning the unit. These were some of the noted factors which must be borne in mind by a valuer before arriving at a reasonable, realistic and sound value opinion.

To elaborate further on how the exercise is undertaken, actual case studies of projects where the author was involved in the valuation assignment is indicated below, although all the facts and figures have been changed for Confidentiality Purposes:

## **Case study 1**

### **The Background**

The property valued consists of all pyrethrum flower processing plant, machinery and equipment located in Nakuru and belonging to Pyrethrum Board of Kenya. Pyrethrum Board of Kenya is a statutory board with the exclusive monopoly of pyrethrum processing in Kenya. The plant was constructed between 1925 and 1961, though the exact dates are not clear. It is well laid on a light industrial zone within Nakuru town and occupies an area of 8.89 Acres and has several support buildings constructed over a span period of approximately 70 years. Various process modifications have been done to the plant, as well as up-grading the plant capacity. The current installed capacity is 60 tons of dry flower per day.

This is the only plant of its kind in Kenya, with other smaller ones being in Tanzania and Rwanda. The plant final product is the pale concentrate, containing about 55% of pyrethrin. This is used for making bio-degradable insecticides. This product is currently superior to the synthetic insecticides in the current environmentally aware consumer market, particularly in Europe. The Pyrethrum Board of Kenya therefore has a competitive edge in the international market. The pyrethrum flower supply from farmers has over the years declined to a level that requires the plant to be shut down till enough flower stocks are available for economic batch running of the plant. For this reason, the plant is idle most of the times. However, once the supply side has been addressed, the industry has a very bright future.

### **The Assets under Valuation**

The machinery and equipment in the oil depot included, without limitation; weigh bridges, weigh scales, conveyors, bucket elevators, silos, cyclones, sifters, suction fans, chutes, pellet and hammer mills, condensers, holding tanks, extractors, scrubbers, luwa

heat exchangers, filters, process pumps, driers, fire engines, air compressor/blowers, rotary valves, refrigeration plants, boilers, reverse osmosis plants, evaporators, drills, vices, shaper machines, lathe machines, power hack saws, grinders, welding machines, fork lifts, air receivers, standby generators, power transformers, chillers, gas chromatography equipment, vacuum pumps, ovens, spectrophotometers, weighing balances, stirrers, water baths, moisture balances, refrigerators, aerosol filling machines, fuel tanks, product piping, chain conveyors, trolleys, hydrant pipe work, foam tanks, electrical distribution systems, motor vehicles, fuel tankers, trailers, tractors.

The machinery and equipment is wholly owned by Pyrethrum Board of Kenya. Information concerning any encumbrances of the property was not given. The property was inspected on diverse dates between 6<sup>th</sup> and 10<sup>th</sup> April 2009. Other necessary investigations and analysis were carried out later.

The values concluded in the appraisal report are the Replacement Cost New, Depreciated Replacement Cost and Open Market Values as of 30<sup>th</sup> April 2009, the date the valuation is effective.

#### **Summary of important conclusions from the case study**

**Subject:** All pyrethrum flower processing plant, machinery and equipment located in Nakuru and belonging to Pyrethrum Board of Kenya.

**Summary description:** The subject personal property includes without limitation:

- (1) weigh bridges, weigh scales, conveyors, bucket elevators, silos, cyclones.
- (2) sifters, suction fans, chutes, pellet and hammer mills, condensers.
- (3) holding tanks, extractors, scrubbers, luwa heat exchangers, filters.
- (4) process pumps, driers, fire engines, air compressor/blowers.
- (5) rotary valves, refrigeration plants, boilers, reverse osmosis plants.
- (6) evaporators, drills, vices, shaper machines, lathe machines.
- (7) power hack saws, grinders, welding machines, fork lifts, air receivers.

- (8) standby generators, power transformers, chillers, gas chromatography equipment
- (9) vacuum pumps, ovens, spectrophotometers, weighing balances.
- (10) stirrers, water baths, moisture balances, refrigerators.
- (11) aerosol filling machines, fuel tanks, product piping, chain conveyors.
- (12) trolleys, hydrant pipe work, foam tanks, electrical distribution systems.
- (12) motor vehicles, fuel tankers, trailers, tractors.

*Ownership Interest Appraised: Fee Simple Interest at Pyrethrum Board of Kenya.*

Factors considered

Expected future life (EFL)- the EFL of each machine was judged by observing its general condition at the time of physical inventory.

### **Highest and Best Use**

The subject assets are used as an integrated pyrethrum flower processing and pyrethrin production facility with quality control and entomology laboratories. Despite the high world market demand and high prices for pyrethrin, the current pyrethrum flower supply is too low to sustain economic operation of the factory. Due to the strategic pyrethrum flower production location of Kenya, there is need to fully address the problems of supply. The highest and best use is for the equipment to continue being used for the purposes initially intended.

### **VALUATION REPORT**

Since the valuation report was for different purposes, deferent approaches were used as follows;- open Market Value- this was worked out applying the factors of depreciation, namely (1) physical deterioration, (2) functional obsolescence and (3) economic and external obsolescence. The calculations were properly tabulated and the results presented in a valuation report. The starting point is the establishment of Replacement Cost New

Overall Value Indications: As of April 30, 2009

Replacement Cost New	Kshs. xxx
Depreciated Replacement Cost	Kshs yyy
Open Market Value	Kshs. zzz

Limiting Condition: None.

### **Valuation Problems encountered from the case study**

- (i) Obsolescence of every kind present - Technological, functional, and economic obsolescence. The buildings have an age varying from 10 years to 75 years. The remaining useful life varies from building but in general, building structures may last from 50-60 years or more subject to regular maintenance.
- (ii) Establishment of Depreciated Replacement Cost (DRC) of plant and machinery i.e. quantification of obsolescence is difficult.
- (iii) Non-marketability aspect due to the specialized nature of the Pyrethrum processing plant. No market for such specialized properties. Sale instances on the fringes of the factory land are non-comparable. - As such Sales Comparison Inadequate.
- (iv) The entity is and has been running losses since the last four years. Traditional Approach is Inadequate and unless restructuring is done to consider notional surplus.
- (v) The construction of the buildings is random and of outdated asbestos sheets walls and roof.

In conducting the above valuation different approach has been attempted and used given the nature of the assignment. The starting point by the Engineer was establishment of Replacement cost new of all plant, equipment and machinery components. This was to ascertain the insurance value of the property.

In order to arrive at the open market value (OMV) all forms of obsolescence were considered and more importantly the specialized nature of plant and further even the possibility of dismantling and consequently a value of approximately a third of replacement cost new was returned.



Given the expectation of the client and the purposes to which the valuation report was expected and more importantly the nature of item to be valued (plant and Machinery) and the fact that this is a processing plant of its kind in the region, the need for a registered consulting Engineer with training in valuation of plant and machinery was a necessity. His technical expertise was a major contributor to the overall success of the exercise. Plant and machinery stand on land which contributes greatly on value particularly in the long run. Plant and machinery depreciate over a time period! Land and in some instances buildings appreciate. Therefore, suffice is to say that for any serious plant and machinery valuation exercise, Engineers alone cannot successfully handle the exercise neither the valuers with real Estate background.

However, the purpose of valuation is the determinant on who to handle the exercise. An excellent example being if the valuation is required for insurance purposes, Registered and consulting Engineer trained in plant and machinery valuation would be the most suited consultants as opposed to open market valuation for mortgage or sale purposes which requires the expertise of a property valuer with real estate background.

## **Case Study 2**

The author was involved in the valuation of newspaper printing and publishing machinery in January, 2008. The clients needed a valuation within two days. So, at first, an interim value estimate was given by applying price index to historical costs and a final value on receipt of quotation from the supplier.

The illustration given below will throw light on the lacuna of ascertaining replacement cost new by applying a price index to the historical cost.

The newspaper printing machine was purchased new from the U.K. in April, 1999 for U.K. pounds 3,955,000/-. In order to arrive at a quick valuation for February 2009, a valuer utilized the price index for the newspaper printing and publishing machinery published by Her Majesty Stationary Office (HMSO), UK which indicated a price increase in the intervening period at less than 20%. The quotation later received was for UK pounds 5,502,000/- from the original supplier showing an increase of about 45%.

## CHAPTER FIVE

### FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Valuation of plant and machinery is a multi-disciplinary exercise and unlike with other types of real property valuation, where purpose determine the methodology, when conducting the valuation of plant and machinery the process is not so straightforward. There is no direct formula and as such the valuer selects the method which allows for a justifiable sound value opinion. To compound the problem when conducting the exercise, there are so many challenges ranging from identification of the asset, computation of depreciation, sources of reliable data/comparables, obsolescence of the plant amongst others.

Consequently there was a need to critically examine the manner to which plant and machinery valuation is conducted and approaches/ methods used with a view to identifying their weaknesses geared towards providing some practical measures/ solutions and thus a more justifiable value opinion.

#### 5.0 Research Findings

Valuation of plant and machinery is not only a multi-disciplinary subject involving economics, industrial process, law, insurance, environmental issues, planning, over and above valuation but also a multi-disciplinary exercise involving different experts. In this view a valuer has ultimately to shape as a techno-econo-commercial expert, i.e., a valuer must be familiar with the technical economic and commercial aspects of work undertaken by him and liaise with the company directors, auditors, accountants, plant engineers, insurance companies for interaction and feedback.

The valuer acts as the team leader when consultants in specialty areas are associated with the work of valuation. He has also to take the decision as to whether deployment of consultants is necessary in any particular field which may help the valuation process. In the matters of intricacies such as deployment might become necessary in order to arrive at a valuation which is realistic, meaningful and useful. The decision in this behalf

rests with the valuer who has to coordinate the investigation by the specialists and cover all the findings in his report.

The valuation team has to carry out thorough inspection of plant and machinery in the undertaking in order to ascertain what is on the site, and inspect the records of the client. With highest regards to the company accounts it is observed that the records of clients are not always up-dated whether they are maintained manually or computerized.

In valuation of plant and machinery the most applicable and reliable method/ approach is Replacement Cost. Other approaches such as sales comparison and income are rarely used due to their shortcomings.

Many valuers with real estate training background in Kenya rarely engage themselves in plant and machinery valuation. The practice seems to be that the exercise has been and is outsourced to consulting and registered engineers with some training in plant and machinery appraisal.

There are different “experts” in plant and machinery valuation in Kenya. This include valuers with real estate background, technicians, engineers, registered engineers, registered and consulting engineers trained in plant and machinery appraisal and some people purporting to be experts but without any traceable formal training in plant and machinery valuation.

In Kenya, unlike in valuation of a real estate properties where the Valuers Act Cap 532 Laws of Kenya spells out the professional requirements and the experience for one to qualify to be registered as a valuer, there is currently no any recognized examination qualifying for practice as a professional valuer of plant and machinery, with the result that anybody could practice such profession provided he had a capacity to generate the clientele. In other countries such as India, there are well laid down requirements for qualification to be registered as a plant and machinery valuer, namely:-

**(i) he must**

- (a) be a graduate in mechanical or electrical engineering from a recognized university; or
- (b) possess a post graduate degree in valuation of plant and machinery from a recognized university; or
- (c) possess a qualification recognized by the central Government for recruitment to superior services or posts under the central Government in the fields of mechanical or electrical engineering.

**(ii) (A) he must be a person formally employed:-**

- (a) in a post under Government as "Gazetted officer "
- or
- (b) in a post under any other employer carrying a remuneration of not less than Rs. 2000 per month;
- or
- (c) as a professor, reader or lecturer in a university , college or institution preparing students for a degree in mechanical or electrical engineering or for (any qualification) referred to in clause (i) , and must have retired or resigned from such employment after having taught for a period of not less than ten years.

Or other requirements stipulated in Wealth Tax Rules Rule 8A (8), (13) and (14).

Registered engineers are experts in establishing the cost of plant and machinery basically required for insurance purposes but registered valuers are experts in establishing the value of plant and machinery. However, registered and consulting engineers trained in plant and machinery appraisal and co-working with registered valuers provides the expertise required in instances of open market valuation assignments.

A look at the training of plant and machinery valuation in Kenya reveals that the training is virtually lacking at the undergraduate level in the Department Real Estate and construction management where valuers are trained and at masters level it is insufficient.

From consumers point of view it is unclear on who should actually value plant and machinery inspite of the current practice where instructions are issued to valuation companies/firms who in turn outsource the services of registered engineers. Due to the degree of responsibility involved, there should be a clear indication on exactly who the instructing party should deal with given the intricacies surrounding sub- contracting.

Local banks amongst other valuation services consumers are satisfied with plant and machinery values returned by valuation firms. Our investigations on who actually does plant and machinery valuation revealed that three major consultants have been frequently approached by different valuation firms with a view to providing this vital service.

Kenya Revenue Authority (KRA) tendency to use declared prices and not values of plant and machinery from their country of origin seem to be denying this country the much needed revenue. Our current minister for finance ought to have exploited this avenue to increase government revenue. Price is value in exchange and must not be construed to be value or cost.

To this end, the major clients (Banks) specific requirements for both Real Estate Valuers and Plant machinery Valuers on the recent past advertisements[(Daily Nation of Friday, February 13, 2009 (page 21) and East African Newspaper of 27<sup>th</sup> April – 3<sup>rd</sup> May, 2009 (page 6) ] can be seen to be implying the following:

- 1) Real Estate Valuers cannot handle complex plant and machinery assignments. This is a reinforcement of our earlier findings.
- 2) Engineers, alone cannot equally handle plant and machinery valuation (in the clients' opinion, otherwise they would be specifying their preference to engineers). This collaborates the findings from the case study assignment.

In addition this observed outcome leads to a conclusion that there exists a significant market opportunity for valuers of plant and machinery to establish a competitive advantage over their competitors by differentiating their valuation services. It is

proposed that this differentiation should not be by means of valuation techniques, there is sufficient evidence to demonstrate that this narrow resource-led approach has not impressed clients. Rather it is proposed that differentiation to be based on the broader business concerns of the client. The valuation practices involved in Kenya indicate that clients are exhibiting an increasing degree of sophistication in evaluating the abilities of plant and machinery valuers, when considering the appointment of consultants. In particular there is evidence of increasing trend to interrogate practices, prior to their appointment, on how valuation exercise will be undertaken.

## **5.1 Conclusion**

Plant and machinery valuation is not a straightforward exercise and the problem in the exercise is not really lack of sales/data comparables (because even the approach /method is not applicable anyway) but insufficient knowledge and exposure on where to obtain relevant data. In addition, inappropriate valuation team cognition since valuation of plant and machinery is a multi-disciplinary exercise and must be approached as such.

The demand for plant valuation services appears to be increasing as evidenced by the fact that virtually all the leading companies are desperately short of skilled personnel. This is well evidenced by the recent adverts on our local and international dailies seeking for consultants in plant and machinery valuation.

Quite clearly, there is a steady change of emphasis as the traditional manufacturing base declines and specialist plant valuation services are required more and more in the high-tech sectors. Consequently, valuers have to become ever more familiar with the appraisal of computers and electronic installations both in the office and on the shops.

## **5.2 Recommendations**

Recommendations for the plant and machinery valuation in Kenya following this project would relate to the training of the undergraduate courses at the University of Nairobi. There is dire need for the training of a specialist in this field and consequently our

universities need to either develop or redevelop the curriculum for the course. A suggestion on curriculum development of undergraduate students in Real Estate and Construction Management would be substituting some of the non core units with plant, equipment and machinery unit.

At masters degree courses, it is appreciated on the introduction of plant and machinery valuation unit. However, after careful survey of the felt needs in our country well evidenced by the overwhelming demand for plant and machinery valuation services, there is need to reconsider allocation of more time. A suggestion would be by merging near similar/related units and having two units in this emerging discipline. I think the course developers will focus on the issue in a manner the department deems fit and proper.

Further to the training aspects there is need to have statutory qualification for a plant and machinery valuer (in addition to the requirements of a property valuer) to avoid possible confusion on who really should address plant and machinery valuation. A possible suggestion would be those with post graduate training in this field and registered engineers trained in plant and machinery appraisal should be strictly allowed to practice.

For complex plant and machinery assignment, as in the case with processing industries which are generally sophisticated by their very nature, the services of a registered or consulting engineer trained and educated in valuation methodologies must be sort.

The problem with plant and machinery is not really lack of reliable sales data/market information but insufficient exposure of valuers to know the source of information. It is therefore paramount for valuers to be attending machinery exhibitions and industrial trade fairs, for example Canton Trade Fair in Guangzhou – China amongst others to get the information about current prices of equipments. Plants and machinery are hardly sold by auction and it is often difficult to find data from sales by private treaty as these are rarely published. The best thing is to ascertain prices by personal contacts.

The participation in valuation seminars of eminent resource persons in different streams of specialization pertaining to the field of valuation of plant and machinery both from within the University of Nairobi and other universities should be explored and encouraged. In my practicing career I have found experts like Professor J.M. Kihiu of Crystal Ball Associates, a firm of chartered machinery surveyors, amongst others to be of much help and indeed a lot can be learnt from their expertise in this field owing to their mechanical engineering background and special training in plant and machinery appraisal. We can consider inviting them for even some of our continuous professional development sessions. Their contribution will definitely enrich our valuation services in this particular area.

In the context of globalization and the rapid changing and emerging markets especially in the area for instance, when multinational insurers come with totally new concepts of valuations which should be adopted, then the university in conjunction with the relevant professional institutions should be organizing for seminars with a view to exchanging information about new principles of valuation and thus practice worldwide. In line with the above and from my professional experience the Blue Handbook locally referred to as the Valuers Handbook is insufficient. A suggestion on the way forward would be probably to insist of the valuers exploiting the benefits of the Red Book which is renewed every year. This will go along way with not only developing our valuation techniques but also ensuring the internationally best practice and consequently quality reports to our clients.

Kenya Revenue Authority should engage the services of plant and machinery valuers. By so doing this will boost greatly the government revenue kitty a necessary factor towards our economic growth locally and globally a contribution towards millennium development goals.

The clients should involve the consultants, i.e., the valuer, in developing terms of reference (TOR) which must be interpreted to suit the needs of the clients. Before commencement of the exercise discussion should be held between the parties and the expert should comment on the understanding of the terms of reference to avoid ambiguity.



Plant and machinery valuation being a multi-disciplinary subject and exercise there is a need to create more awareness on not only the methodology / approaches available but the procedure to be adopted. A valuer should not remain complacent as regards his own education and knowledge. The information, technology and digitalization of systems are provided a faster pace to advance and expansion of Technology. He should educate himself and keep informed by the process known as “continuing education”. He should participate in seminars, attend workshops and read literature in the field regularly. He should keep himself up-to-date with the latest information in his and other related fields. In other words a valuer should not only share his knowledge with others but should also be his own teacher regularly and continuously. In addition, there is a need for us to learn from the experts and we should be willing to co-work and develop this field. Practice makes perfect!

“ a client can sometimes make a simple valuation difficult, or a difficult one, simple. We, as plant and machinery valuers, must simplify to our client the various methods of valuation and guide them the right way as we best see it. We never stop learning and we are always going to make mistakes at some given point in time. We live in the world of trial and error, and that’s the life. Let’s do the best we can and continue to learn from those mistakes and the knowledge of others. ”

- George W. Lynch

### **5.3 Test hypothesis**

The existing plant and machinery valuation approaches are inadequate due to unavailability of market/verifiable data. From the evidence deduced from data collected, the valuation approaches are so far adequate depending on circumstances of the case. Further to this, market data on plant and machinery are available. However, the problem with plant and machinery valuation in Kenya is lack of proper and insufficient training of valuers at undergraduate and masters level at the university. In addition there is lack of exposure of practitioners on the relevant sources of plant and machinery market data and thus the current uncertainty on who handles plant and machinery valuations.

### **5.4 Area (s) for further research**

Taking account of these suggestions, recommendations for further research following this project could focus on plant and machinery valuation detailed specific training needs in Kenya.

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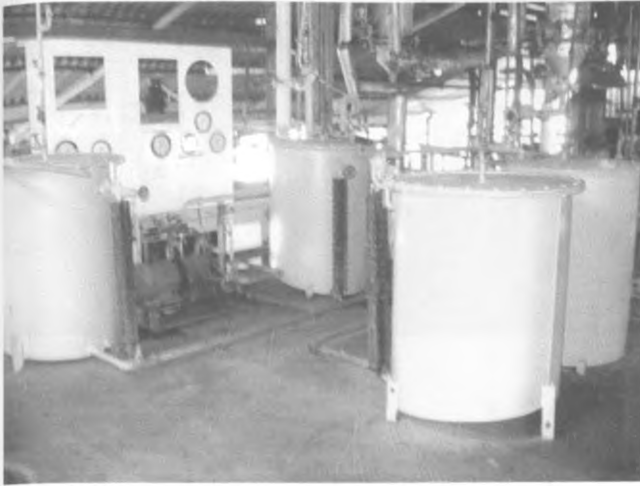
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APPENDIX I

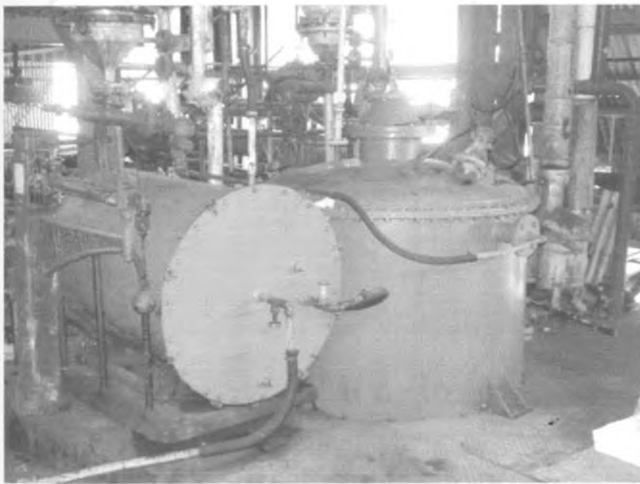
SAMPLE PHOTOGRAPHS- PYRETHRUM BOARD OF KENYA (APRIL 2009)



**Figure 01. Pale Conc Batch Tanks**



**Figure 02. M1 Methanol Tank**



**Figure 03. Methanol Scale and Batch Tanks**



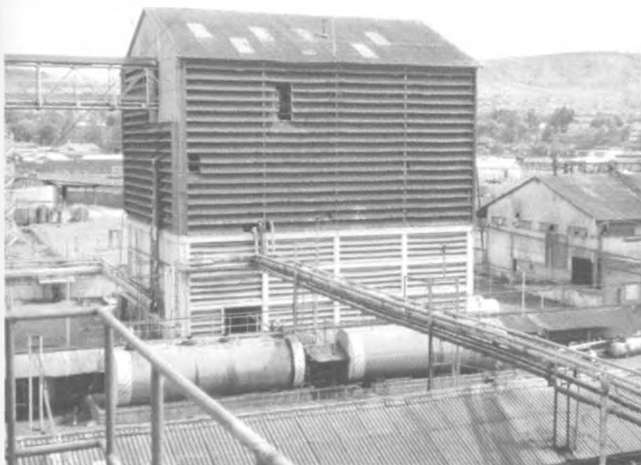
**Figure 04. SST Storage and SST Miscellaneous Holding Tanks**



**Figure 05. Acetone Mixing Tank**



**Figure 06. Carbon Filters**



**Figure 07. Extraction Plant**



**Figure 08. SST and Methanol Batch Tanks**

## **APPENDIX 2 - RESPONDENTS**

### **(i) List of Responding Valuers:**

- Knight Frank (Valuers) Limited.
- Syagga and Associates.
- Metro Cosmo Valuers Limited.
- Value Zone Limited.
- Landmark Realtors Limited
- Tysons Limited.
- Lloyd Masika
- Kinyua Koech Limited
- Regent Management
- Cyrstal Valuers, Limited.

### **(ii) List of valuation services major consumers:**

- Barclays Bank of Kenya Limited.
- Diamond Trust Bank (K) Limited
- Kenya Commercial Bank Limited.
- Standard Chartered
- National Bank of Kenya
- Industrial Development Bank
- Alexander Forbes (Insurance Company)
- Insurance Company of East Africa Limited (I.C.E.A)
- East African Development Bank (EADB)
- NIC Bank

### **(iii) Auctioneers - Nguru Enterprises**

### **(iv) Kenya Revenue Authority (KRA)**

### **(v) Other Valuation Services Consumers**

- Local authorities
- GTZ – Ministry of Water- UWASAM
- Safaricom, Firestone and Kenya Railways etc.

### **(vi) Secondhand and New Machines Dealer – Thelen Machines Wambacher Strabe 7-9 41334-Nettal (Germany) Europe**

## APPENDIX 3: QUESTIONNAIRE

### **Questionnaire on Valuation of Plant and Machinery in Kenya**

#### **Introduction**

The central task in valuation is to define value. In 1848, John Stuart Mill authored the "Principles of Political Economy" wherein he opined "..... happily there is nothing in the laws of value which remains for the present or any future writer to clear up; the theory of the subject is complete...". The theory is simple- the application is complex. History has vindicated Bonbright (1937) for describing the appraisal profession as a "dangerous profession". The peril of the profession does not lie in the fallible process of valuation, which is adopted to resolve the client's problem about property value. Thus, the dangerousness of the profession lies in the way valuer's apply the valuation foundations (i.e. principles, concepts and factors affecting property value) to address their clients' valuation problem(s). The problem(s) that beset(s) the valuer in any valuation assignment stems from the fact that he is called upon to estimate "something" (i.e. value) which is "indefinable"! Even when placed in the realm of the market, every definition of market value has been a focus of controversy.

Valuation of Plant and Machinery is a process requiring knowledge in law, economics, industrial process, insurance, environment and planning.

It is in this context that this research seeks to examine how valuation of plant and machinery is handled and the attitude of this vital service consumers with a view of creating more awareness on the subject geared towards a more justifiable value opinion.

The information provided in this questionnaire will be treated with confidence and the results of this study will be available to the respondents on request.

Thank you for taking time to give your response.

**Section A: Questionnaire to Valuers**

**“A Critical Evaluation of Plant and Machinery Valuation Approaches in Kenya”**

(i) Name of the organization .....

(ii) Respondent's position.....

1. How many registered valuers does your firm/company has?

- (i) Less than 3
- (ii) Between 3 - 5
- (iii) Over 5

2. How many years has your firm been in operation? *Please circle*

- (i) Less than 5 years
- (ii) Between 5- 10 years
- (iii) Between 10-15 years
- (iv) More than 20 years

3. (a) Has your firm/company ever handled plant and machinery valuation?

Yes  No

(b) If yes, how many so far?.....

4. If yes above, how do you handle plant and machinery valuations?

- (i) In-house valuation
- (ii) Outsourcing



5. (a) If out sourcing who handles?

- (i) Valuer colleague
- (ii) Engineers
- (iii) Both Valuers and Engineers

(b) If Engineers please specify

- (i) Consulting Engineers
- (ii) Registered Engineers
- (iii) Non Registered Engineers
- (iv) Technicians
- (v) Artisans

6. (a) If In-house, what valuation methodology do you apply?

- (i) Cost approach
  - (ii) Income
  - (iii) Sales comparison
  - (iv) Income and cost approach
  - (v) All of the above
- Other, please specify

(b) What percentage of the cases have you applied:

- - (i) Cost approach
  - (ii) Income
  - (iii) Sales comparison
  - (iv) Income and cost approach
  - (v) All of the above
- Other specified method

(c) Please kindly comment on the following:

- (i) Replacement Costs new approach gives a more justifiable value opinion incase of insurance valuation.
- (ii) Income approach is only applicable for income generating entities

- (iii) Sales comparison is inappropriate due to lack of reliable comparables
- (iv) Choice of method depends on circumstances of each case .....

.....  
 .....

7. To what extent do you agree with the following statement?

	<b>Strongly agree</b>		<b>neutral</b>		<b>strongly disagree</b>
	1	2	3	4	5
(i) "Plant and machinery cannot be valued by a Land Economist"	1	2	3	4	5
(ii) "Plant and machinery valuation should be handled by engineers"	1	2	3	4	5
(iii) "Plant and machinery should not be valued by a Land Economist"	1	2	3	4	5
(iv) "Plant and machinery valuation should not be handled by engineers"	1	2	3	4	5
(v) "Am comfortable when Plant and Machinery is Handled by technicians"	1	2	3	4	5
(vi) "Technicians provide reliable Plant and machinery Valuations"	1	2	3	4	5
(vii) "Engineers should be trained in Plant and Machinery Valuations".	1	2	3	4	5
(vii) "Any Engineer can handle Plant and Machinery Valuations"	1	2	3	4	5
(viii) "Only Engineers trained in Plant and Machinery Valuations should handle valuation work".	1	2	3	4	5

8. Who actually should then value Plant and machinery, and why?.....

.....  
 .....  
 .....  
 .....  
 .....

9. Do you feel there is sufficient training available (if any) to those who carryout plant and machinery valuations in Kenya?

		<b>Strongly agree</b>		<b>neutral</b>	<b>strongly disagree</b>	
Yes	<input type="checkbox"/>	1	2	3	4	5
No.	<input type="checkbox"/>	1	2	3	4	5

10. Do you think the valuers curriculum should be expanded to include plant and machinery valuations at undergraduate/Post graduate level?

		<b>Strongly agree</b>		<b>neutral</b>	<b>strongly disagree</b>	
Yes	<input type="checkbox"/>	1	2	3	4	5
No.	<input type="checkbox"/>	1	2	3	4	5

Any other comments you would wish to make on the subject.....  
.....  
.....  
.....

Thank you for taking the time to answer this questionnaire.

**Section B: Questionnaire to Valuation Services Consumers - Banks & Insurance Companies**

**“A Critical Evaluation of Plant and Machinery Valuation Approaches in Kenya”**

- (i) Name of the organization .....
- (ii) Respondent's position.....

1. Type of the Organisation (Please Tick the relevant )

- (i) Bank
- (ii) Insurance company

2. (a) Has your organization ever encountered plant and machinery valuation?

- Yes  No

(b) If 'yes' How many cases?.....

3. (a) Who handles your Plant and Machinery valuations?

- (i) A firm of Registered Valuers with Land Economic background.
- (ii) A firm of Consulting Engineers.
- (iii) A firm of Registered Valuers consulting with Registered Engineers

(b) If Engineers please specify

- Consulting Engineers
- Registered Engineers
- Non Registered Engineers
- Technicians
- Artisans

(iv) Others, specify.....

.....

.....

4. (a) Has your organization ever had instances of overvaluation of plant and machinery?

Yes  No

(b) If 'yes' how many cases?

1 2 3 4 5 6 7 8 9 10

(c) How was overvaluation detected?

- (i) The highest bid was below the advised open market value returned.
- (ii) Through due diligence – the comparable machine providers quotations were far much below the value(s) ascribed.
- (iii) Comparison of different value opinion by different valuation firms.

5. (a) Has your organization ever had instances of undervaluation of plant and machinery?

Yes  No

(b) If 'yes' what percentage?

- (i) Less than 25%
- (ii) Between 25% - 50%
- (iii) Between 50% - 75%
- (iv) Between 75% - 100%

(c) How was undervaluation detected?

- (i) Several bids were higher than the advised open market value returned.
- (ii) Through due diligence – the comparable machine providers quotations were far much higher than the value(s) ascribed.
- (iii) Comparison of different value opinion by different valuation firms.
- (iv) Any other way (please specify)

6. How satisfied are you with plant and machinery values frequently returned by Valuers?

- (i) Very dissatisfied
- (ii) Dissatisfied
- (iii) Satisfied
- (iv) Very satisfied

7. Any other comments you would wish to make on the subject.....  
.....  
.....  
.....

Thank you for taking the time to answer this questionnaire.

**Section C : Questionnaire to Auctioneers**

**“A Critical Evaluation of Plant and Machinery Valuation Approaches in Kenya”**

(i) Name of the organization .....

(ii) Respondent's position.....

1. How frequent do you encounter plant and machinery auctions in a year?

- (i) Less than 20 cases
- (ii) Between 20-40 cases
- (iii) Between 20-50 cases
- (iv) Over 50 cases

2. (a) Do you have plant and machinery valuations done before an auction is carried out?

Yes  No

(b) If 'yes' how many cases?

3. (a) From your experience are the Auctions/forced liquidation value always realized from a liquidation sale?

Yes  No

If 'yes' how many cases?

1 2 3 4 5 6 7 8 9 10

4. (a) Has your organisation had instances of overvaluation of plant and machinery?

Yes  No

(b) If 'yes' above how many cases?

1 2 3 4 5 6 7 8 9 10

(c) What percentage of the overall plant and machinery?

- (i) Less than 25%
- (ii) Between 25% -50%
- (iii) Between 50% -75%
- (iv) Between 75%-100%

(d) If 'yes' above who had done the valuation?

- (i) A firm of Registered Valuers with Land Economic background.
- (ii) A firm of Consulting Engineers.
- (iii) A firm of Registered Valuers consulting with Registered Engineers

(e) If Engineers please specify:

- Consulting Engineers
- Registered Engineers
- Non Registered Engineers
- Technicians
- Artisans

(iv) Others, specify.....  
.....

(f) How was overvaluation detected?

- (i) The highest bid was below the advised open market value returned.
- (ii) Through due diligence – the comparable machine providers quotations were far much below the value(s) ascribed.
- (iii) Comparison of different value opinion by different valuation firms.

5. (a) Has your organisation had instances of undervaluation such that several bids of plant and machinery were more than the valuation?

Yes  No



(b) If 'yes' how many cases so far?

- 1      2      3      4      5      6      7      8      9      10

(c) How was undervaluation detected?

- (i) Several bids were higher than the advised open market value returned.
- (ii) Through due diligence – the comparable machine providers quotations were far much higher than the value(s) ascribed.
- (iii) Comparison of different value opinion by different valuation firms.
- (iv) Any other (please specify). .....

Thank you for taking the time to answer this questionnaire.

**Section D: Questionnaire to Kenya Revenue Authority (KRA)**

**“A Critical Evaluation of Plant and Machinery Valuation Approaches in Kenya”**

**Respondent's position.....**

1. How do you value or handle valuation of plant and machinery for taxation purposes?

- (i) Rely on the cost of machine as per the country of origin.
- (ii) Assessment is based on comparable machines imported earlier.
- (iii) Formal valuation /assessment are undertaken by experts. Please specify

- Valuers (Land Economist )
- Consulting Engineers
- Registered Engineers
- Non Registered Engineers
- Technicians
- Artisans

(iv) Any other (please specify). .....

2. How many plant and machinery assessments do you do in a year?

3. Do you think this (these) method(s) are adequate? What are advantages and limitations of the method (s) .....

.....  
.....

4. Any other comments you would wish to make on the subject:

- (i) The approach used is sufficient.
- (ii) There is need for the KRA to engage in-house experts in plant and machinery assessment.
- (iii) The KRA should be outsourcing the services of qualified private practioners
- (iv) KRA should develop their own in-house assessors who are constantly trained on how plant and machinery assessment is carried out

Thank you for taking the time to answer this questionnaire.

**Section E: Questionnaire to other Valuation Services Consumers**

**“A Critical Evaluation of Plant and Machinery Valuation Approaches in Kenya”**

(i) Name of the organization .....

(ii) Respondent's position.....

1. Type of the Organization (Please Tick the relevant )

Local Authority, Learning Institutions e.g. University, Polytechnic etc, Parastatal, Water and Sanitation Company (ies)

2. Has your Organization ever encountered plant and machinery valuation?

Yes  No

(b) If 'yes' how many cases so far?

1 2 3 4 5 6 7 8 9 10

3. (a) Who handles your Plant and Machinery valuations?

- (i) A firm of Registered Valuers with Land Economic background.
- (ii) A firm of Consulting Engineers.
- (iii) A firm of Registered Valuers consulting with Registered Engineers

(b) If Engineers please specify

- Consulting Engineers
- Registered Engineers
- Non Registered Engineers
- Technicians
- Artisans

(c) Others, specify.....

.....

4. (a) Has your organization ever had instances of overvaluation of plant and machinery?

Yes  No

(b) If 'yes' how many cases so far?

1      2      3      4      5      6      7      8      9      10

(c) How was overvaluation detected?

- (i) The highest bid was below the advised open market value returned.
- (ii) Through due diligence – the comparable machine providers quotations were far much below the value(s) ascribed.
- (iii) Comparison of different value opinion by different valuation firms.

5. (a) Has your organization ever had instances of undervaluation of plant and machinery?

Yes  No

(b) If 'yes' how many cases?

1      2      3      4      5      6      7      8      9      10

(c) How was undervaluation detected?

- (i) Through due diligence – the comparable machine providers quotations were far much higher than the value(s) ascribed.
- (ii) Comparison of different value opinion by different valuation firms.
- (iii) Several bids were higher than the advised open market value returned

(d) If 'yes' above who had done the valuation?

- (i) A firm of Registered Valuers with Land Economic background.
- (ii) A firm of Consulting Engineers.
- (iii) A firm of Registered Valuers consulting with Registered Engineers

(e) If Engineers, please specify

- Consulting Engineers
- Registered Engineers
- Non Registered Engineers
- Technicians
- Artisans

(f) Others, specify.....

6. How satisfied are you with plant and machinery values frequently returned by Valuers?

- |       |                   |   |
|-------|-------------------|---|
| (i)   | Very dissatisfied | 1 |
| (ii)  | Dissatisfied      | 2 |
| (iii) | Satisfied         | 3 |
| (iv)  | Very satisfied    | 4 |

7. Any other comments you would wish to make on the subject.....  
.....  
.....  
.....

Thank you for taking the time to answer this questionnaire.

**Questionnaire on Valuation of Plant and Machinery in Kenya**

**Section F: Questionnaire to Secondhand and New Machines Dealer – Thelen  
Machines Wambacher Strabe 7-9 41334-Nettal (Germany) Europe**

**“A Critical Evaluation of Plant and Machinery Valuation Approaches in Kenya”**

**Respondent's position.....**

1. How many years has your company been in operation?.....  
.....

2. (a) What type of machines does your company handle?

- (i) Secondhand
- (ii) New
- (iii) Both New and Secondhand

(b) What percentage comprises second hand and new if (iii) above?

- (i) Less than 25% secondhand
- (ii) Between 25% -50% secondhand
- (iii) Between 50% -75% secondhand
- (iv) Between 75%-100% secondhand

3. Where is your major market?

- (i) Locally i.e. around Europe
- (ii) Export to other Continents
- (iii) Both Local and International

4. (a) How do you handle valuation of your second hand plant and machinery?

- (i) In-house
- (ii) Outsourcing

b) If In-house please tick the approach/methodology used

- (i) Cost approach
- (ii) Income
- (iii) Sales comparison
- (iv) Income and cost approach
- (v) All of the above

(c) What percentage of the cases do you use:

- (i) Cost approach
- (ii) Income
- (iii) Sales comparison
- (iv) Income and cost approach
- (v) All of the above

(d) Please kindly comment

- (i) Replacement Costs new approach gives a more justifiable value opinion in case of insurance valuation.
- (ii) Income approach is only applicable for income generating entities
- (iii) Sales comparison is inappropriate due to lack of reliable comparables
- (iv) Choice of method depends on circumstances of each case

5. Any other comment you would wish to make on the subject.....

.....

.....

Thank you for taking the time to answer this questionnaire.