"A STUDY INTO THE ORGANIZATION AND EXECUTION OF BUILDING MAINTENANCE WORKS IN THE MINISTRY OF WORKS, HOUSING AND PHYSICAL PLANNING WITH SPECIAL REFERENCE TO NAIROBI PROVINCE."

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A thesis submitted in part fulfilment for the Degree of Master of Arts in Building Management in the Department of Land Development, at the University of Nairobi.

DECLARATION

I, DOUGLAS BENSON OTIENO AIOO, hereby declare that this thesis is my original work and has not been presented for a degree in any other University.

signed.

DECLARATION OF THE SUPERVISOR

This thesis has been submitted for examination with my approval as University Supervisor.

P. M. SYAGGA

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ABSTRACT

This study examines the organization and execution of building maintenance works in the Ministry of Works Housing and Physical Planning with special reference to Nairobi Province with the objectives of determining whether the maintenance management practices employed by the ministry are efficient and effective. The study therefore examines the suitability of the organization structure and the management process in executing building maintenance works.

It is divided into six chapters with the first chapter devoted to introductory formalities and the laying of the foundation to the study. In the main, it discusses the significant role of the built environment in man's day-to-day activities and the vast sums of money spent on putting up this environment. The study then observes that despite this significant role and the vast sums of money spent, this capital investment is generally neglected and apparently left to decay at will. From there on the study highlights the importance of building maintenance and what building maintenance management is.

The ministry has been chosen because it is the largest single organization with a long established building maintenance unit. It was further decided to restrict the study to Nairobi Province due to time factor and because the practices of the Ministry are similar throughout the republic. Furthermore Nairobi

Province is the Ministry's 'nerve centre' in building maintenance accounting for about 41% of its budget.

The second chapter is devoted to building a theoretical model for the ministry's Nairobi Province paying attention to its size, the production technology of building maintenance and the environment under which the ministry operates. Chapters three and four contain the case study being the findings of interviews, questionnaires, searches of the correspondence files, reports and the building organization and operations manual (BOOM). The study witnessed an organization structure not suitable to the organization and overcentralization of authority. This overcentralization and poor structure has led to lengthy procedures and lack of effective control over service and component departments.

The data collected from the middle of October 1984 to middle of January 1985 is then tabulated in chapter five and analysed. Generally the data indicates poor performance in the organization and execution of building maintenance works. The data reveals further that despite the deficiencies noted in chapter three and four, the management does not effectively employ maintenance tools in order to determine the direction of performance. The existing records are not evaluated, comparisons between alternatives not done to determine which one offers more advantages over the other.

Finances are seen to be lacking but even the little funds voted for maintenance is at times surrendered unused while the buildings continue to deteriorate.

Chapter six is devoted to the summary of the findings and recommendations of the study. It is considered here that more authority, responsibility and accountability should be pushed down to the provinces and the depots to get rid of the maze of procedures that water down efficiency and effectiveness.

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CHAPTER ONE

INTRODUCTION

The Statement of the Problem

The built environment plays a very important role in the economic development of a country. It is the built environment that provides man with the living and working facilities. As a living facility the built environment should provide an environment with all the amenities and facilities for a family life, a retreat where he can shelter himself from the external environment and rest after a hard day's work. As a working facility, the built environment affords man shelter and protection from the external environment when in pursuit of his social and economic commitments. The built environment is therefore central in the production of man's wants and needs like rest, goods and services that are necessary for his continued livelihood and the future generations to which he owes responsibility and accountability.

The built environment as a product is very expensive. In 1981 for instance, it accounted for about 31% of Kenya's gross fixed capital formation representing K£118,000,000[1]. This is a colossal amount of capital asset and therefore its preservation and conservation should be given great consideration. Furthermore, the bulk of the built environment is constructed from borrowed funds on which interest is charged.

The interest may be payable for a considerable length of time during the life time of the building, road or any physical facility and interest-free enjoyment of the facility is usually realizable in its later life. This calls for well planned preservation and conservation measures to lengthen the interest-free period of the useful life of the facility as shown in figure 1.1. Looked at from another point of view, the resources invested in the built environment could have been invested elsewhere to earn more than is being realized from the facility.

The above argument on alternative investment or opportunity cost could be extended to cover the fact that the built environment is a destabilizer to the natural environment. The natural environment too has a role in the day-to-day activities of man. Its destruction (clearing sites, felling trees for construction and the resultant soil erosion and desertification etc) should be considered as costs to the society arising from the decision to build the environment. A society conscious of this element of cost should therefore spread this cost as much as possible by maintaining the built environment. The faster the built environment detoriorates the more sites will be cleared and trees felled to replace the decayed built environment.

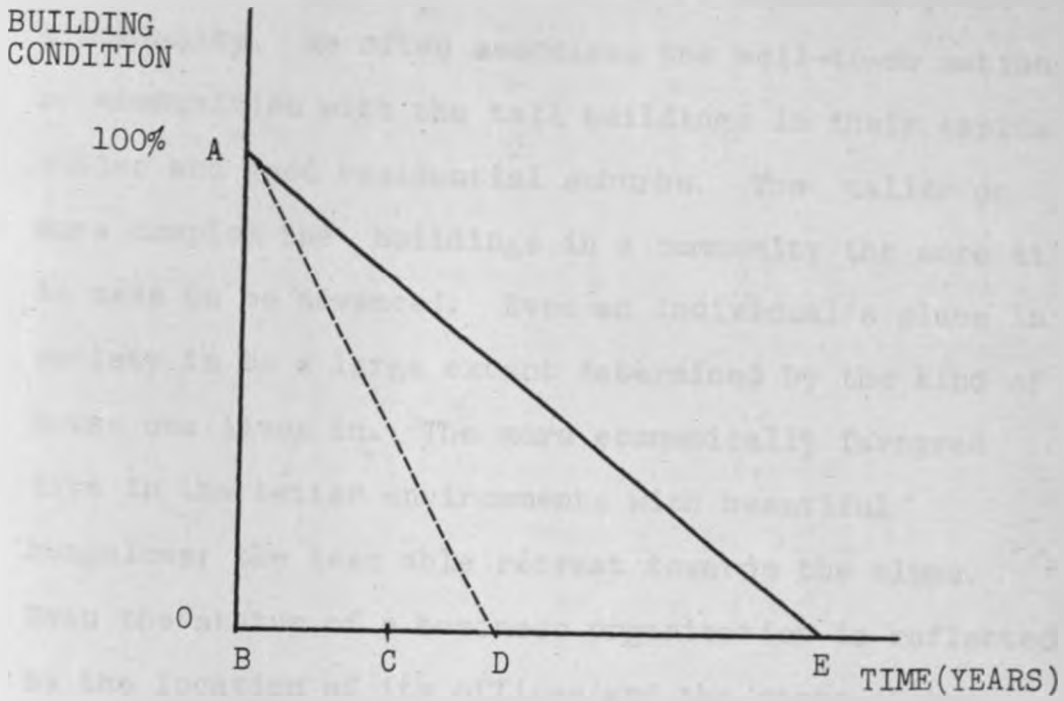

Figure 1.1:. Comparison between a well maintained Building and a poorly maintained Building.

BA is the life cycle of the building from practical completion to demise.

BC is the loan repayment period.

BD represents the life of a poorly maintained building.

BE represents the life of a well maintained building.

The poorer the maintenance of a building the shorter the time of its enjoyment as a facility after loan repayments.

The built environment is also a source of pride for a community. We often associate the well-to-do nations or communities with the tall buildings in their capital cities and good residential suburbs. The taller or more complex the buildings in a community the more it is seen to be advanced. Even an individual's place in society is to a large extent determined by the kind of house one lives in. The more economically favoured live in the better environments with beautiful bungalows; the less able retreat towards the slums. Even the status of a business organization is reflected by the location of its offices and the state of the building from which it operates.

The built environment therefore plays a central role in man's everyday activities. Whereas this role may be recognized as indicated by the vigour with which people crave for accommodation, envy the well housed and marvel at the sky-scrapers, there does not seem to be a corresponding potrayal of care in the preservation of the built environment. A casual survey will show neglect that would amount into millions of Kenya shillings. A survey[2] carried out by Britain's ministry of Housing and Local Government in 1967 revealed that one in nine dwellings was classified as unfit for use and of the remainder nearly one in four lacked one or more of the ministry's list of four basic amenities i.e internal wc, fixed bath, wash basin and hot and cold water at three points.

This survey confirmed the results of previous work by the National Institute of Economic and Social Research which concluded that arrears of housing maintenance probably amounted to 8 to 9 times the volume of work actually being carried out.

In Nairobi, estates like Ziwani, Kaloleni, Makadara, Makongeni, Shauri Moyo, Bahati, Muthurwa and Starehe do not have internal WCs and water supply, fixed baths and wash hand basins if we have to go by Britain's Ministry of Housing and Local Government's list of basic amenities. These estates look long forgotten with broken communal WCs, overgrown grounds and walls that have not been painted for decades. In the city centre (Kirinyaga Road, River Road, Ronald Ngala Street, Racecourse Road etc) are buildings that have been neglected over the years and potray lack of adequate care by the owners. Schools, health centres and hospitals too are not accorded adequate care.

This kind of situation should cause concern given that the country's resources are not able to provide these facilities (housing, schools, hospitals) to cope with a population growing at more than 3.4% per annum.[3] For example, the government placed a high priority on the development of education facilities in the five year plan period 1979-83 with the expected target of providing facilities for 95% of primary school age children.[4] This has not been realized as in the city of Nairobi alone there are in 1985 over 32,000 applicants for standard one places in primary schools against the available 24,000 places.[5]

Nor have efforts to provide adequate housing for the growing urban population met with much success. For example, only 12,000 units were provided instead of the targetted 100,000 units in the 1974-78 plan period.[6] The failure to meet this increasing demand for building activity should be an incentive to preserve whatever buildings we have in order to postpone possible early replacements of obsolete ones. However, this does not seem to be the case.

The failure is likely to continue because of the inflationary economic trend which has been on since the mid 70s. This creates a situation whereby the nation will be affording less and less for a bigger and bigger demand. However, despite the generally dilapidated built environment, consciousness for sound buildings exists in that the quality of buildings usually approved by the authorities is high. But if this initial good quality is left to decay it will turn into slums which would be unacceptable. If we are unwilling to witness our built environment turn into slums, no effort should be spared to arrest the situation.

The Importance of Building Maintenance

"I would have bought a car except for the costs of running it". This is a common statement. There is that consciousness that failure to maintain a car on the road will render it ineffective for the purpose for which it was bought. However, there is almost a complete lack of consciousness when it comes to buying or putting up a building.

Whereas a car may fail to perform its functions because of a minor fault, a building will be seen to perform its functions despite the existence of numerous defects therein. At times a building will be seen to perform its functions until it becomes dangerous to its inhabitants. A roof leak in the bedroom may probably prompt the occupant to shift his bed to a different position and place a container to receive the water from the leakage. He may overlook the leakage as long as he can continue to get his sound sleep. But the water will continue to eat the roof structure and a new leak develops above his new bed position. He may continue shifting his bed until he can shift no more. It is then that he may look for remedy.

Eventually when that defect is made good, it is done for the building to continue performing the functions for which it was built. Buildings are put up both as a factor of production and accommodation. It is therefore important to maintain buildings so that production of goods and services for which it is a factor of production is not interrupted. As a factor of accommodation buildings that do not offer adequate resting and relaxation atmosphere due to non-maintenance may render their occupants less productive in their economic and social pursuits.

It is common knowledge that whenever there is a financial crisis, building maintenance suffers most because of failure to recognize it as an essential service. In these times of soaring inflation when

building maintenance may be grossly underfunded, prestigious building projects could be initiated at costs many times above what would be required to maintain the existing stock satisfactorily. Whereas there is always reason for increasing say our residential building stock in an attempt to bridge the gap between demand and the existing stock, there should be seen to be a rational allocation of finances to cover both maintenance and new works. It has been mentioned that residential and non-residential buildings comprised about 31% of the nation's gross fixed capital formation in 1981. To realize greater value for this capital debt, it is important that the buildings are maintained in a planned manner. Maintenance of buildings therefore shows our appreciation of our investments' worth.

In Britain, the maintenance and repair sub-industry at its depressed state accounts for about one third of the total output of the construction industry.[7] It is estimated that maintenance works being carried out is only about one-eighth of the total maintenance works due. At this depressed state, the sub-industry still contributes more to employment (labour force in numbers) than agriculture and horticulture in Britain.[8] Of course Kenya is basically an agricultural country and the contribution of maintenance and repair sub-industry to employment and gross domestic product is far below that of the agricultural sector. However, the point being emphasized here is that with stepped up activity in

this sub-industry, its contribution to the domestic economy would be appreciable.

The Public Health Act, Chapter 242 of the Laws of Kenya stipulates too low a standard if the significance of maintenance is to be realized. It stresses in section 117 that "buildings are constructed and maintained in such a manner that they are neither injurous, unsafe nor dangerous to health." The Registered Land Act Chapter 300 section 55 of the Laws of Kenya also leaves room for varied interpretation of the state of repair required of a building. If higher and definitive national standards were set and adhered to, increased employment and contribution to the gross domestic product by the sub-industry would be enhanced. A survey[9] revealed that more than 80% of the maintenance and repair contractors in this country engage in the activity as a source of extra income. The contractors come from all the sectors of the economy (agriculture, commerce, industry etc) and as such stepped up activity in the maintenance and repair sub-industry would have a positive impact on the other sectors of the economy.

Building Maintenance Management

The maintenance and repair condition of our buildings depends on a number of factors:[10]

(i) When briefing the designer, the client should state his building requirements without being vague.

He should let the designer know his maintenance policy and planned life of the building as these would influence the designer on the elements and components to incorporate in the design. The designer, however, also has a professional duty to assist the client in developing an adequate brief.

(ii) Design and specification implications on maintenance need adequate consideration. Most design errors are errors of specification or in choice of materials, juxtaposition of incompatible materials or components, incorrect detailing and inadequate provision of easy or safe access for maintenance work. This calls for effective lines of communication between client, designer, contractor and those charged with building maintenance.

(iii) There is a fairly substantial part of the maintenance load which arises from poor construction techniques. However, it is not well established whether these construction defects could be attributed to poor workmanship, lack of expert supervision or unclear specification. Specialist instructions and advice are often not available to the man on site when complex work (especially work involving new materials or components) is

carried out. Even when such information is provided, it may not be in a form suitable for use by the operative. Communication from designers, manufacturers, and suppliers to the site are therefore often at the root of many defects of constructions.

(iv) Environmental influences such as soil types, weather changes, growth or removal of vegetation, earthflows and subsidence and loading also contribute to the maintenance and repair condition of our buildings. Intensity of use is seen in the form of overcrowding which is common in the urban centres due to inadequate supply of housing and doubling up of families in some cases due to high rentals and the extended African family.

(v) Poor maintenance management is also contributory to the maintenance and repair condition of our buildings. This would mean that although resources for building maintenance may be available, poor planning and use of these resources may enhance poor maintenance and repair condition of the buildings.

The above factors therefore form the central focus of building maintenance management. Building maintenance management is concerned with "the organization of the maintenance department to ensure that the assets of the organization are planned, provided, maintained, operated and disposed of at the lowest total cost to the organization."[11] It employs management principles of planning, organizing, directing, controlling and evaluating the performance achieved against the set objectives. Good management practice would require that the organization is aware of what gains it would achieve through the set practices. It would therefore have to set its objectives and work out a plan of achieving the objectives. As the organization works towards the objectives, it records all the necessary aspects of work including the results it has achieved so far. The results will then be analysed to enable the management to draw certain conclusions. Some failures would probably be assigned to design. Some components or materials would be seen to be incompatible with the user activities, and would lead to questioning whether it was the designers fault or the clients inadequate briefing.

Good management practice would also ensure that the organization is able to evaluate its own performance within the resources at its disposal. The organization will therefore have to establish its own measures that will help it gauge its performance.

Building maintenance management therefore aims at effective use of the scarce resources available so as not only to prolong building life but also defer expenditure on new buildings that would replace obsolete ones. The management must have a clear understanding of the functions that buildings under its care perform. It must also know what priority should be accorded what buildings or the various elements of the building in view of the resources available, and the various alternative courses of action and the attendant costs. This clarity on what to do and how to do it leads to preservation of the physical characteristic of the building and its services in the most optimal manner. The building users would also get some psychological satisfaction thus allowing them time to attend to other nation building activities instead of spending a lot of time between their premises and the maintenance offices. That is, policies are set and adhered to as a guide to achieve the set objectives.

The Study Objective

When accused of not maintaining buildings to the required standards, the maintainers quite often say that they do not have enough funds. Whereas this may be true, it would be wrong to conclude that if adequate funds were made available to the maintainers then buildings would be maintained to the required standard.

This study therefore wishes to explore if the organizational set-up of the Ministry of Works, Housing and Physical Planning is suitable for effective and efficient execution of maintenance works. To find out if the organizational set-up is effective and efficient this study will develop a model from the existing literature that will stand in as the ideal maintenance organization. This study, however, recognizes that there is no single system that would be said to be universally ideal because the set up of an organization will depend on its range of activities, quality of manpower and production technology of the discipline in question. In using the model the study will attempt:

(i) to analyse the ministry's current maintenance management practices;

(ii) to determine to what extent the ministry's practices deviate from or conform with the model, and the shortcomings that may be attributable to the possible deviation;

(iii) to recommend in the light of the size of the organization and the environment under which it operates the practices that would be appropriate to achieve maximum economy.

The Choice of Study Area

The study will concentrate on the Ministry of Works, Housing and Physical Planning. This organization

has been chosen because it is the largest single organization in Kenya dealing with building maintenance. The replacement value of its building stock was valued at K£498,791,149 during 1982/83 financial year.[12] At 1.5% of the replacement value the funds required for maintenance in that year should have been about K£7,470,000. This is a colossal amount and warrants a study to establish if the system that is charged with its spending is efficient enough to achieve maximum economy.

The study of the ministry is narrowed down to Nairobi Province which handles about 41% of the central government's total maintenance works.[13] The concentration of these buildings in Nairobi makes the maintenance branch a busy place requiring sophisticated organizational skills. Nairobi is also the seat of the central government thus giving the maintenance staff a variety of building types including houses, complex office blocks as well as hospitals. The study will also concentrate in Nairobi because the time available would not allow effective study of the ministry's operations throughout the republic. It should also be noted that the ministry's practices are standardized and similar throughout the republic.

The Scope of the Study

Building maintenance management is part of the overall process of building development i.e. planning projects, designing them, constructing them and their management is a continuous cycle. It is that part of the building process that refers to systems of managing physical facilities embracing both the established principles of management and the functions expected of those charged with such responsibilities.[14] However, this study will limit itself to the suitability of the organization structure and how it lends itself to the planning and control of the execution of maintenance works to achieve effectiveness and efficiency.

The specific aspects that form the scope of this study are therefore;[15]

(i) finding out what (if any) objectives or standards have been set by the ministry;

(ii) finding out if the ministry is aware when various elements in buildings would require replacement so that they can plan their inspections and replace the elements in time before they can cause further damage;

(iii) finding out if the ministry carries out uneconomic or unnecessary work. This will involve finding out if the work done is due to normal wear and tear, carelessness of the occupant or design and constructional faults. The study will also address itself to the

appropriateness of remedial measures;

(iv) finding out if the ministry has a good data base to enable costing of work before the operatives move to site;

(v) finding out if the ministry has done any work study to enable the fixing of start and finish times for individual jobs so that the works can be planned at times in relation to user activities;

(vi) finding out whether the ministry has a clear view of the merits and demerits of employing direct labour or engaging an outside contractor and how effectively this knowledge may be used in achieving the set objectives; and finally,

(vii) finding out whether the ministry has got any formal systems for feedback of information on progress so that actual costs and performance can be compared with those predicted and remedial action taken if necessary.

The study has been divided into six chapters with the first chapter being the introduction which includes the statement of the problem, study objective , choice of study area, scope of study and research methodology.

Chapter two is review of related literature which in the main discusses the production technology of building maintenance. The production technology combines with the size of the ministry and the environment under which the ministry operates to give a model structure at the end of the chapter. Chapter three discusses the ministry's maintenance policies while chapter four discusses how it executes its maintenance works. In chapter five the study analyses data that has been obtained from the ministry's records and the relation of the data to the deviations from the model are highlighted. Chapter six contains a summary of the study, conclusions and then recommendations. References appear at the end of each chapter with a selected bibliography at the end of the study. Appendices are also attached at the end of the study.

Research Methodology

The study commenced in July, 1984 with library research after the writer had been stimulated by the ever increasing complaints about the ministry's performance in executing building maintenance works. With the aid of four assistants, data collection began in the middle of October, 1984. Data was collected through the use of questionnaires, personal interviews with maintenance staff (management and operatives), with occupants of some of the premises maintained by the ministry including residential buildings, offices and institutions.

Other information was extracted from annual reports and correspondence files, MOWH&PP buildings register print-out, MOW 150 (contracts record books), work instruction books, expenditure returns and accounts ledgers. The exercise was completed in the middle of January, 1985.

It was not possible to get all the required data. The work instructions books in some depots were soft covered which due to intensive use had some pages torn and some inelligible. In one depot, work instruction books covering part of the period intended to be covered by this study were completely missing and could not be traced. The other problem was that the new depot boundaries were established in 1980/81 so that only three out of five depots could be investigated for the full period intended by the study. The jobs in the works instruction books are entered serially which made it easy to determine the total number of works reported in a given financial year. The work instructions books should also have provided an easy source of actual funds spent on minor maintenance works but unfortunately only one depot recorded the costs of work done in the registers. The other depots do their costing in loose costing sheets only and costings of works of various periods were scattered in loose folders making it difficult to collect this piece of information.

Financial returns for the years before 1978/79 could not be found in both the provincial and headquarters archives.

The contract books were well kept and properly recorded except for a few cases where practical completion dates were not recorded and as such the study had to use the date of final payment as the completion date. Surveys to determine the physical condition of the buildings was carried out on week-ends when it was expected that most occupants would be in except for the institution and office. The selection of the buildings surveyed was such that each depot and the various categories of buildings were covered. The residential buildings however, had a bigger share because of their large numbers and for each estate selected at least twenty per cent of the units were surveyed at random with the smaller estates having upto eighty per cent units surveyed. Some occupants could not allow their houses to be inspected despite explanations and documentary proof of the survey's purpose. Others were enthusiastic and after the interviews asked if they could now expect improved services. Some of them even thought that the survey and interviews were unnecessary because it is obvious the services are poor. This however did not dissuade us from continuing with the surveys and interviews.

Data analysis will be largely descriptive and presented in the form of tables as necessary. The first set of data will be used to prove the existence or not of maintenance effectiveness in the ministry.

These will mainly be data on the physical condition of the selected buildings, user reaction and backlog in minor maintenance works. The study will then look into the funding situation and in the light of the first set of data, display data to show how funds are spent in the form of financial returns. Where applicable and possible data has been collected to cover at least eight years so that the analysis will show whether the performance is declining or improving. Decline or improvement will then be discussed vis-a-vis deviations from the model formulated by this study.

FOOTNOTES

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3. Republic of Kenya, Central Bureau of Statistics, Economic Survey 1981, (Nairobi, 1981), p.29.

4. Finn Olesen, Planning and Design of School Building for Self Help Projects, (Manual for Housing Research and Development Unit, University of Nairobi, 1980), p.1.

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6. Paul M. Syagga, "A Study of the Management of Local Authority Housing Estates in Kenya with Special Reference to Mombasa, Kisumu and Thika Municipal Councils" (M.A. Thesis, University of Nairobi, 1979) p.3.

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8. Patricia M. Hillebrandt, Economic Theory and the Construction Industry (London: MacMillan, 1974) p.10.

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10. Great Britain, Building Maintenance: The Report of the Committee, (London, 1972) pp.22-23.

11. Reginald Lee, Building Maintenance Management, (London: Granada Publishing, 1981), pp.14-15.

12. Republic of Kenya, Ministry of Works, Housing and Physical Planning, Building Register Print-Out (Nairobi, 1983).

13. Republic of Kenya, Ministry of Works, Housing and Physical Planning, Building Register Print-Outs (Nairobi, 1978-1983).

14. K.A. Wahab, "Maintenance Management and Physical Performance of Buildings," The Tropical Environment: A Publication of the University of Nigeria, Volume 1, Number 1 (March, 1980), pp.103-106.

15. Reginald Lee, Building Maintenance Management, pp.171-173.

CHAPTER TWO

REVIEW OF RELATED LITERATURE AND THEORETICAL FRAMEWORK

Introduction

There is very little research that has been carried out in the field of building maintenance in Kenya. In one study Yahya has observed that our built environment is deteriorating rapidly because the African landlord is a poor maintainer.[1] He has recognized that there is no initiative to programme some works that require programming like internal and external redecorations and renewal of roof coverings. We therefore find a situation whereby the benefits of caring for our built environment are still not recognized. This may probably be attributed to the fact that the modern permanent building which serves generations is a new concept in that traditionally a house "died" with the owner. With this kind of mentality the property owners have not appreciated the need to pass to the coming generations a built environment that is sound.

Further, this dilapidated built environment can be attributed to the property owners investment perception. Those who acquired property before the onset of the current inflationary trend in the early 1970s saw real property investment as a hedge against inflation with a positive net income receivable immediately.

The 1970s saw an increase in the influx of the rural population to urban centres thus creating an increased demand for accommodation. The landlords therefore assumed a commanding position and continued to hike rents at will, well above the mortgage repayments. The earnings from real property investments and the increasing demand for accommodation led to a rush to put up more buildings without much attention being paid to the quality of construction. Existing buildings also did not receive adequate attention because they earned more than was expected of them. However, the late 1970s and 1980s have portrayed a different picture. New estates in Nairobi like Southland, Ngummo, Akiba (Langata), Onyonka and High View are not fully occupied several years after their completion. It is this kind of situation that may alert a far-sighted landlord to keep his property sound for a positive net rent may only be receivable in later years.

Yahya's was a general comment on the state of our built environment and did not isolate a group of properties under one care to systematically investigate the reasons attributable to such dilapidation. Syagga[2] has isolated three local authorities in Kenya and identified the cause of the dilapidated built environment. He says that from accounts, 1966-1974, large sums of money have been spent on maintenance and repairs, while from empirical observations and interviews with tenants the estates are generally in poor state because of poor organization and control of the use of

labour and materials. The study further asserts that the question of lack of finance is not crucial, the poor maintenance standards are derived from poor organization in the execution of maintenance works and lack of appropriately qualified staff.

However, the study only looked at maintenance and repairs as one of the aspects of housing estate administration. The study therefore like most housing estate administration studies gave the subject of maintenance and repairs a superficial treatment such that the indepth organization and execution aspects of maintenance works were inevitably unexplored.

Maintenance Defined

Lee[3] has discussed at length various definitions of maintenance as offered by the BS 3811:1964, the Building Maintenance Committee, the Woodbine Parish Report and White. The discussion is progressive such that every step improves on the previous definition. It commences by defining maintenance as a combination of any actions carried out to retain an item in, or restore it to an acceptable condition. However, because standards keep changing, "acceptable condition" is defined further to mean a currently acceptable standard so that the utility and value of the facility or item is sustained.

After incorporating the element of improvement in the definition of maintenance, there is recognition by the Woodbine Parish Report that there are constraints and as such the standards to be achieved would be determined more

by the amount of money allocated rather than as a result of assessing the benefits obtained from maintaining the building to a particular standard. However, this study feels that the constraint in achieving the currently acceptable standard should not be incorporated in the definition because the failure to achieve the acceptable standard does not in itself nullify the intention to reach the required standard. The definition of maintenance should be seen to mean the intention to reach some acceptable standard. This acceptable standard is also given weight in the ministry's Building Organization and Operations Manual which talks of "the original or equivalent condition."[4] This study agrees with the more consolidated definition by White which states that "maintenance is synonymus with controlling the condition of a building so that its pattern falls within specified regions." Lee further asserts that the word "control" suggests positive activity which is planned to achieve a defined end result. The term "specified regions" is similar to acceptable standards but brings in a new concept that acceptability has got upper and lower limits within which the condition of the building must be maintained.

Functions of a Maintenance Organization

The objective of this study is to determine whether building maintenance works in the Ministry of Works, Housing and Physical Planning (MOWH&PP) are organized and executed effectively and efficiently so as to achieve value for money.

An organization may be said to be effective if it assumes "a viable relationship with its environment".[5] In the case of a maintenance organization this viable relationship would be seen in the degree of satisfaction of the building users. If they are happy with the performance of the organization then the organization would be deemed to be effective. This, however, would not mean that the organization is efficient. Efficiency is put into consideration when we ask how the organization achieved the "effectiveness". In achieving effectiveness the organization may waste resources or may do work which should not be done at all as Ducker puts it, "there is surely nothing so useless as doing with great efficiency what should not be done at all."[6]

Organization is defined as the "structure and process by which a cooperative group of human beings allocate its tasks among its members, identifies relationships and integrates its activities towards common objectives".[7] This definition involves the structure of tasks (organizing), the placement of human beings in the structure (staffing) and the integration of the two functions into a human system of activities. Execution is the carrying out of the structured activities (tasks) by human beings in the structure. This study will therefore address itself as to the suitability of the structure and process of the ministry in executing building maintenance works to achieve the acceptable standards or standards as limited by the available resources.

An organization is designed to suit the nature of business that the organization carries out, that is, it should be suited to its tasks. Each and every discipline has got its production (organizational) technology. It is the technology, the size of the organization and the environment under which it operates that determine its structure.

> Structural dimensions of an organization like formalization, specialization, standardization, hierarchy of authority, centralization, complexity, professionalism and personnel configuration should not be picked and chosen at random. Rather, they should be selected according to internally consistent groupings.8

Therefore to design an organizational model for the Ministry's maintenance department, Nairobi province, it is first of all necessary to understand the production technology of maintenance, the size of the province and lastly its environment.

Three major functions of a maintenance organization have been identified.[9] These are advisory, organizational and control which remain the same no matter what the size of the organization. These functions represent the modern system approach with an internal self-evaluation system. It conforms with the N. Wiener view of organization being defined as "an adaptive system which is entirely dependent on measurement and correction through information feedback."[10] This is represented by a diagram in figure 2.1.

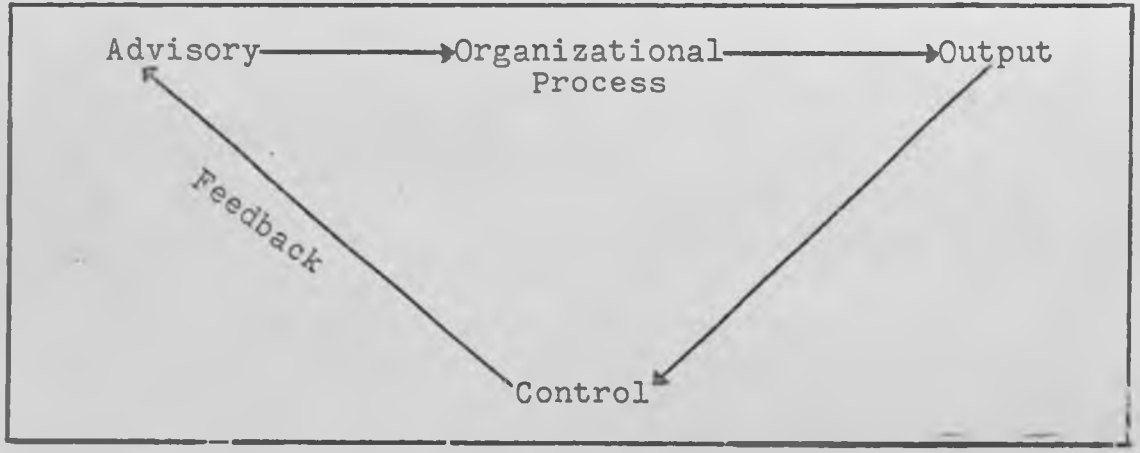


Fig. 2.1: Organizational system

The advisory role arises because maintenance is a service provided to the parent organization, owners or users. A maintenance organization is therefore specialized in this field and since it does not hold all the authority and resources, it advises the parent organization, users or upper management on such matters as:

(i) the standards to be maintained;

(ii) appropriate maintenance policies;

(iii) finance;

(iv) costs and other data for upper management decisions;

(v) maintenance implications of designs for proposed new buildings.

The maintenance organization then has to organize how it will carry out its work. This is the internal technical structure of the organization and involves defining who is responsible for what and how the work will be carried out. Also known as the organizational role, it involves the use of central administration, and contract or direct labour. The control function emphasises on the timely feedback of accurate information on the state of the system to enable the management to gauge its performance. This involves identifying the workload, programming and supervising its execution. It further involves the use of the budgetary control systems and feedback.

Types of Maintenance

Maintenance work can be broadly divided into "planned " and "unplanned."[11] This is illustrated in figure 2.2.

Planned Maintenance

The planned maintenance system identifies work it intends to carry out during a given period and programmes it so that its execution is spread throughout the given period. In this system there is forethought, control and use of records to a predetermined plan.[12] It is subdivided into "planned corrective maintenance". Planned preventive maintenance involves anticipating failures and the necessary preventive action taken before they occur. Planned corrective maintenance involves carrying out inspections to detect failures so that a programme for making them good can be formulated. Clifton states that the fundamental basis of both systems is deciding in advance:[13]

(i) the individual items of the building/ facility to be maintained;

(ii) the form, method and details of how each item is to be maintained;

(iii) the tools, replacements, materials, tradesmen and time that will be required to carry out this maintenance:

(iv) the frequency at which these maintenance operations must be carried out;

(v) the method of administering the system;

(vi) the methods of analysing the results.

Planned maintenance will therefore result in greater utility of the building/facility, greater and more effective use of resources (labour, time, materials etc). Collection, recording and subsequent interpretation of maintenance data will also result in:

(i) improved budgetary control;

(ii) improved stock control of materials since the quantities stocked and recorded will be realistic;

(iii) provision of information upon which management can make realistic forecasts and decisions;

(iv) focusing attention on frequently recurring jobs and types of defect, and the type, frequency and cost of individual repairs.

Unplanned Maintenance

Where there is planned maintenance, unplanned maintenance is work resulting from unforeseen breakdowns. This includes emergency works caused by failures.

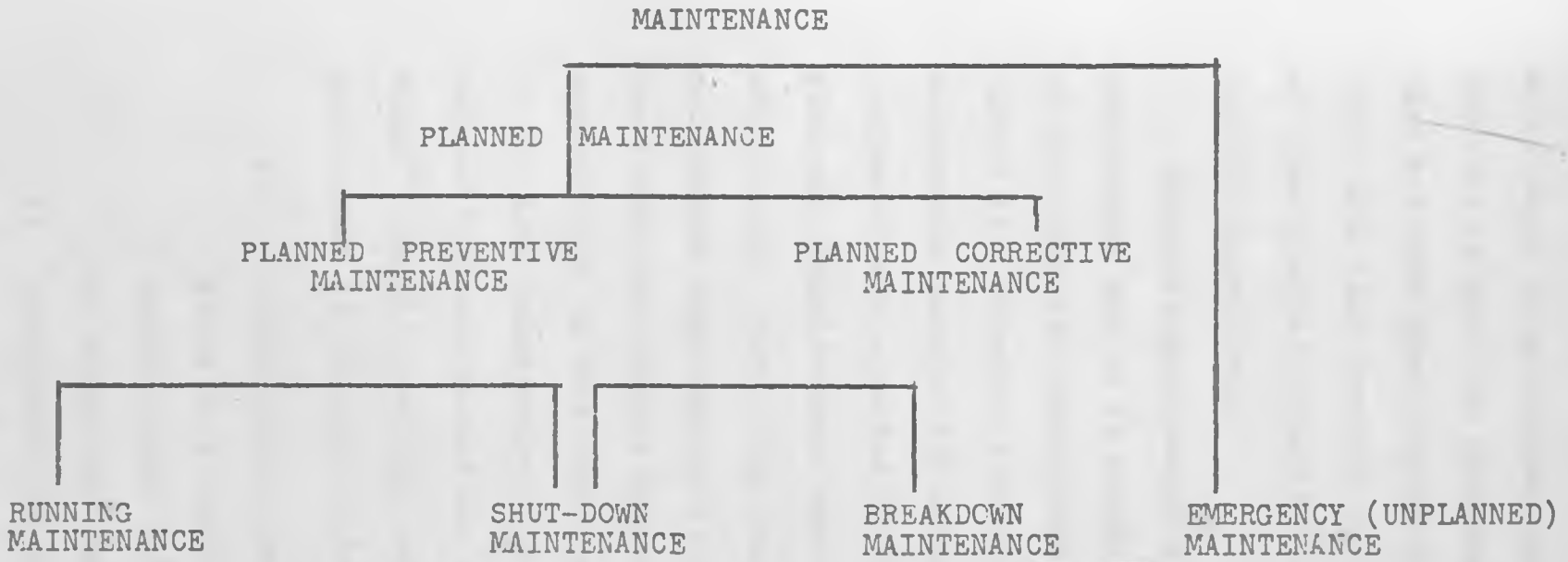


Figure 2.2 Relationships between various forms of maintenance

Where there is no planned maintenance there is a tendency to wait for failures to be reported and then they are made good despite the fact that some of them could have been foreseen or could have been taken care of under planned corrective maintenance if there were regular inspections.

Unplanned maintenance is also termed day-to-day maintenance and is by nature minor maintenance items of low costs and unpredictable. Their unpredictable nature is a constant source of trouble for the maintenance manager for without analysing their occurence over a period of time, it may not be easy to plan and organize their execution efficiently and effectively. More often than not, effectiveness of a maintenance organization is gauged by its response to the day-to-day maintenance because the occupants (major source) will in most cases report what they would like to see done immediately. It is important to have a balance between planned and unplanned maintenance. Wahab[14] says that relying solely on unplanned maintenance is objected to because:

(i) tenants attitudes to repairs vary. One group will report everything while others neglect their houses and report nothing no matter how dangerous or inconvenient;

(ii) non-productive travelling time is high especially since most tenants may not accurately record the item requiring repair.

Consequently, the technical support team make several trips to the building before necessary repairs are effected.

One important aspect of unplanned maintenance therefore is lead time or delay time which is the period between the receipt of the request and the actual executing of the work. This permits the regulation of the flow of work to the labour force and the grouping of similar items of work in space and time. The factors which determine the permissible delay time include:[15]

(i) safety considerations and in particular, compliance with statutory requirements;

(ii) user satisfaction which must be considered even though the defect may be in no way dangerous;

(iii) effect of failure on primary activities of the organization requesting repair;

(iv) dispersion of job situations which calls for grouping of jobs requiring same craft skills according to locations to reduce travelling time;

(v) consider cost growth so that defects do not become more expensive due to delays in executing the work;

(vi) misuse of property in that lack of repair may result to further misuse of property and

vandalistic tendencies. The maintenance manager must therefore aim at a standard that would produce a psychological resistance to such tendencies.

The study will therefore address itself as to whether the ministry organizes the day-to-day maintenance works to eliminate the disadvantages that go with it.

Standards

At any given time the manangement should be aware of its workload. This can be achieved by the management determining the maintenance standard required for each kind of building, building element, facility, equipment and plant. The required standard of maintenance should depend on how much the failure to achieve the set standard will affect the objectives of the parent organization or the users of the building or facility and how sensitive the owners/users are to the failure. Sensitivity is used here to refer to how readily the owners/users are able to provide the necessary resources to maintain that standard. If the resources availed to the maintenance department is not adequate to achieve the set standards then the cost of these resources could be construed to be the standard to be achieved, the resources being employed with maximum economy.

Lee[16] outlines three ways in which the building/facility standards can be expressed. The first expression can be in physical terms whereby an element could be left to deteriorate upto a predetermined point before remedial

action is taken. Presumably deteroriation beyond this point would be detrimental to the users of the building. However, what is stressed here is that deterioration to this point must be directly measurable to allow uniformity of interpretation by more than one competent person responsible for inspections. Some buildings/ facilities have been designed to specific performances. These specifications can be used to express standards. These are called "condition controlled maintenance" and would require programmed inspections to determine whether they have fallen below the expected standards.

Secondly, where studies have been carried out to determine the useful life of elements, a "frequency based maintenance" system could be used so that times when to repair or replace are fixed in advance. The third way is "financial criteria" which may take the form of a variable sum related to the cost of some primary function or replacement value or a fixed sum based on history costs or an analysis of anticipated benefits.

An organization that is conscious of effectiveness and efficiency is goal oriented and the standards expressed are what the maintenance organization aims at. As Nzioki[17] has put it, it is difficult to express maintenance standards in precise terms. He however, goes ahead to express the need to establish standards tied to authorized expenditure limits which should be related to the expected results of doing each job in terms of user satisfaction. Expression of standards is a major bench mark towards efficient and effective execution of maintenance works as it

provides a basis for control which is a rule for an efficient organization. If the set standards are not achieved during the period in question, the control system through feedback will either reset the standards or point out the cause of failure to achieve the set standard. This study will therefore look for the standards set by the ministry and how they are set. The basic concern is not as to whether the standards set are ever achieved but how effectively the management uses them as a tool to evaluate its performance.

Programming Maintenance Work

The standards required provide the maintenance manager with a workload which he can gauge against the available resources. Effective forward planning is difficult with this category of work because of the large number of uncertain factors involved. Programmes must be formulated at different levels and constantly revised according to the new information which is fed into the system. These levels are long-term, annual and short-term programmes.

Long-term Programmes

These provide a policy framework rather than the precise dates when work is to be carried out. Lee states that the purpose of a long-term programme is:[18]

(i) to determine the general level of expenditure on maintenance to achieve the desired standards;

(ii) to avoid large fluctuations in annual expenditure by spreading large items and any backlog over a period;

(iii) to determine the optimum time for carrying out major repairs and improvements so as not to interfere with the user of the building;

(iv) to determine the structure and staffing of the maintenance organization and whether it would be advantageous to employ operatives directly to carry out part or the whole of the work;

(v) to gear the maintenance programme to overall organization policy so that it is compatible with decisions relating to the use of the building e.g. decisions to demolish and rebuild or to move to other premises;

(vi) to consider the effect of proposed capital works on the maintenance organization. The major items of work included in the long-term programmes are painting, reroofing, floor sanding, electrical rewiring and mechanical plants and equipment.

Annual Programmes

The object of annual programming is to provide a more accurate assessment of the amount of work to be carried out during the forthcoming year and to form a basis for the financial budget. Lee states that the major considerations here would be:[19]

(i) timing the work in relation to the needs of the organization so as to avoid interference with the basic user activities and in phase with the overall cash flow pattern;

(ii) providing a uniform and continuous flow of work for all trades in the direct labour force;

(iii) fixing an appropriate time scale for the preparation of contract documents and tendering procedures where work is let to outside contractors and for the advance purchase of materials where the work is to be carried by direct labour;

(iv) apportioning the amount included in the budget to specific jobs or areas of work for control purposes.

The annual programme would be built up from:

(i) individual items of painting and repairs brought forward from the long-term plan after a check inspection to ensure that the work is infact necessary;

(ii) individual items of work disclosed by the annual inspection as being necessary to carry out within the next year;

(iii) individual items of work proposed by users. at the time of carrying out the inspection;

(iv) an allowance for work which it is anticipated will be requested by users during the accounting period, but which is not capable of precise definition at the time of the inspection;

(v) an allowance for routine day-to-day maintenance based on past records.

The works are then costed and apportioned according to their nature and timing between direct labour and contract. If by direct labour, the costs should be broken down into labour and material costs.

Short-term Programmes

This involves allocating the total workload to the months of the year in which the jobs will be carried out. Where the work is to be let to outside contractors, the commencement and completion dates should be entered on a chart which should indicate the dates when the various pre-contract processes should be initiated and completed. The detailed programming of work to be carried out by direct labour force is dependent upon the size and composition of the labour force and the need to provide continuity of work with a minimum amount of travelling between jobs. At the same time, the availability of materials should be considered and in particular, the delivery periods for materials not held in store.

As mentioned above, the estimated costs of the works are worked out and become part of the programme.

The estimated costs provide cost and progress control standards against which actual occurrences are compared and variations measured. Future estimates use this information to make the predictions of time and cost progressively more accurate.

Building Maintenance Manuals

In discussing building maintenance manuals and their application to building maintenance management, Okwemba[20] has quoted one of the findings of the Building Maintenance Committee 1965 as:

> 'the maintenance efficiency would be achieved through collection, analysis and publication of maintenance data on materials' performance, organizational patterns, budgetary control systems, work and method study'.

He has further quoted a proposal by the committee as a solution to whole or part of the maintenance problems. The solution is that the provision of building maintenance manuals for new buildings would provide a useful starting point for systematic recording. Building maintenance manuals provide the basis of planned preventive maintenance which prolongs the life span of building together with their mechanical and electrical installations. The purpose of a maintenance manual is to provide all building users with a common system of maintenance information recording and retrieval for the proper guidance of maintenance operatives, building owners, occupiers, maintenance team and architects. It assists in establishing standardized maintennance procedures which lead to efficiency in building maintenance.

Okwemba has successfully highlighted the important role that a building maintenance manual plays as an information tool. Any efficient and modern management system knows the central role that information plays. A part from the planned preventive maintenance, a manual also assists in improving vital aspects of maintenance management like budgetary control, labour productivity and stock control among others. With these advantages attributable to it, this study therefore expects an efficient and effective maintenance organization to make use of this important tool.

Execution of Maintenance Work

Execution of maintenance work may be carried out in two ways:

(i) by contract

(ii) by directly employed labour.

Whichever method is used for the execution of any particular job, the organization should in its choice show awareness of the advantages and disadvantages that go with the choice. The guiding elements in the choice are cost, quality and convenience. The choice of method should be done during the "annual works programme" stage. According to Lee an organization should base its choice on the following factors:[21]

(i) The nature of the work should be considered so that work allocated to the direct labour force is commensurate to its skills. Whatever is out of range of the available skills can be let out to contractors.

(ii) The total amount of work should be compared against the available labour in terms of cost and manhours and whatever is above the available labour may be let out to contractors.

(iii) The maintenance organization should consider the degree of urgency of a particular job before decision is made as to whether it should be carried out by direct labour or by contract.

(iv) The location of the job may also determine the choice of method.

(v) The quality of workmanship required. High quality workmanship may require close supervision of the work which is more possible with directly employed labour. On the other hand, a contractor on whom the management has built confidence due to good quality workmanship in the past may be preferred.

(vi) Where special security precautions have to be taken it may be safer to employ directly employed labour who owe their allegiance to the the parent organization.

(vii) Market conditions should also influence choice of method. A slump may bring in stiff competition which may be either beneficial to the organization in terms of lower prices or detrimental to organizations that accept tenders only on the basis of their being lowest.

Contract Work

The basis of a contract for building or maintenance work is the offer by the contractor to carry out the work for a certain sum of money and acceptance of that offer by the employer. The two parties have different interests with the contractor aiming to maximise his profits while the empoyer aims at getting an appropriate standard of workmanship at minimum costs. The offer is usually the contractor's tender and the acceptance by the employer must be made within a reasobale time and must be unconditional.

In the vast majority of cases, contracts are discharged by due performance. However, a breach of a fundamental term by one party gives the other party the right to treat the breach as a repudiation and sue for damages. For a breach to constitute repudiation, it must go to the root of the contract and this would include such actions as complete abandonment of whole works before substantial completion by the contractor or failure by the employer to give the contractor possession of the site. It is therefore expected that an efficient and effective organization must specify what action would be taken for the various kinds of breaches.

Lee[22] lists five types of building maintenance contracts and the choice will be influenced considerably by the particular circumstances. First, there is Lump Sum contracts where the contractor agrees to execute work for an agreed sum based on information derived from drawings, specifications, bills of quantities or site inspection.

This is the type used by the MCWH&PP for both new building and maintenance works. However, it should be expected that an efficient organization should use the other types of contracts in order to realize the advantages that go with each contract. For example where the details of a job are scanty it may be advisable to use Schedule Contracts. Small and or urgent jobs may require the use of Cost Reimbursement Contracts. It is also recommended that for small repetitive items of work for which the need to repair is obvious and not dependent upon subjective judgement, Fixed Price Maintenance Contracts may be used with possible cuts in administrative costs and better quality workmanship. Finally, Term Contracts result into a special relationship over the years and permits the contractor to participate in the planning process and possibly suggest alternative timings for the work resulting in some cost savings.

All tendering procedures aim at selecting a suitable contractor and obtaining from him at an appropriate time an acceptable offer, or tender upon which a contract can be let. Seeley[23] mentions The Simon Committee of 1944 which noted that indiscriminate tendering gives rise to low prices culminating in poor workmanship and waste of resources. He then draws attention to the Banwell Report of 1964 which suggested that invitations to tender should be limited to a realistic number of firms, all of whom are capable of executing work to a recognized standard of competence. The report favoured the general use of standing approved lists of contractors.

There are basically three methods of tendering. First, there is Open Tendering whereby the job is advertised in the local press. Secondly there is Selective Tendering whereby the client invites a limited number of reputable firms drawn from the client's standing approved list of contractors. Thirdly, Negotiated contracts involve the client inviting a tender from a single contractor. Here the contractor's ability should be matched with the job at hand and may result into speedier completion and better quality workmanship. The number of firms invited to tender especially where there is Selective Tendering, will depend on the size and type of contract, ranging from three or four for the smallest contracts to twelve for the largest.

Where no serious errors have been found in the priced bills of the lowest tenderer, the tender should be recommended for acceptance. If however, the quantity surveyor finds serious errors in pricing, the contractor should be advised and given the opportunity of withdrawing or standing by his tender. But the final decision on which tender is to be accepted should be made by the employer based on an analysis of the tender against the estimated cost of the job. As the contract proceeds, the supervisor will almost invariably issue further details and instructions. These details and instructions must be in writing on standard forms and should be issued without undue delay when they are necessary. The contractor continually finances works in progress. It is therefore imperative that he should receive interim payments at the

appropriate time and for the full amount due. It is equally important that he should be paid promptly on the certificates, especially since he is expected to pay for materials and operatives. On completion a Certificate of Practical Completion is issued and full payment made less a percentage retention to be paid after the Defects Liability Period is over.

Direct Labour Organization

A direct labour organization is normally under the control of a professionally qualified surveyor whose job it is to determine the maintenance work that is necessary, supervise the work, obtain the necessary materials and measure and cost the work once it has been completed. In view of the fact that the organization of the workload and the control of the work itself is the responsibility of the same person, these organizations lend themselves very easily to a planned maintenance policy. However, direct labour organizations are also well suited to carry out unplanned day-to-day maintenance works.

The basic problem in executing works through direct labour organizations is to ensure that all the various trades and materials are on site at the correct time and that the client is inconvenienced as little as possible. The only way of achieving this is to ensure that the work is properly planned before hand and strictly controlled during its execution. The planning of the work requires a thorough knowledge of what is required in order to determine the correct sequence of activities and a

realistic estimate of the durations of these activities. A programme of work can then be drawn up giving all details of labour, plant and material requirements, the dates that they will be required on site and the length of time that they are required on site. All this information can then be presented in the form of a bar chart as shown in figure 2.3. The bar chart can then be used as a basis for recording the progress of the work by recording actual work against planned work. This system relies on accurate work measurement whilst it is in progress and will be the responsibility of the surveyor or travelling supervisor.

However, there are also the day-to-day maintenance works whose inflow is irregular and unpredictable and as such a constant source of trouble for the maintenance manager. However, the frequencies and types can be analyzed and the procedures for dealing with the remedial work planned. That is, the direct labour force can be sized and manned to deal with the predicted workload and materials kept in store for the more common repairs. The introduction of a delay period permits the regulation of the flow of the work to the labour force and the grouping of similar items of work in space and time. The longer the delay period the more detailed preparatory work and the less likely are delays due to lack of precise instructions as non-availability of materials and plant.

The Work Order System

The Work Order, or Work Instruction or Job Card is the key document used for controlling work input. It provides a medium for the recording of labour hours and materials which

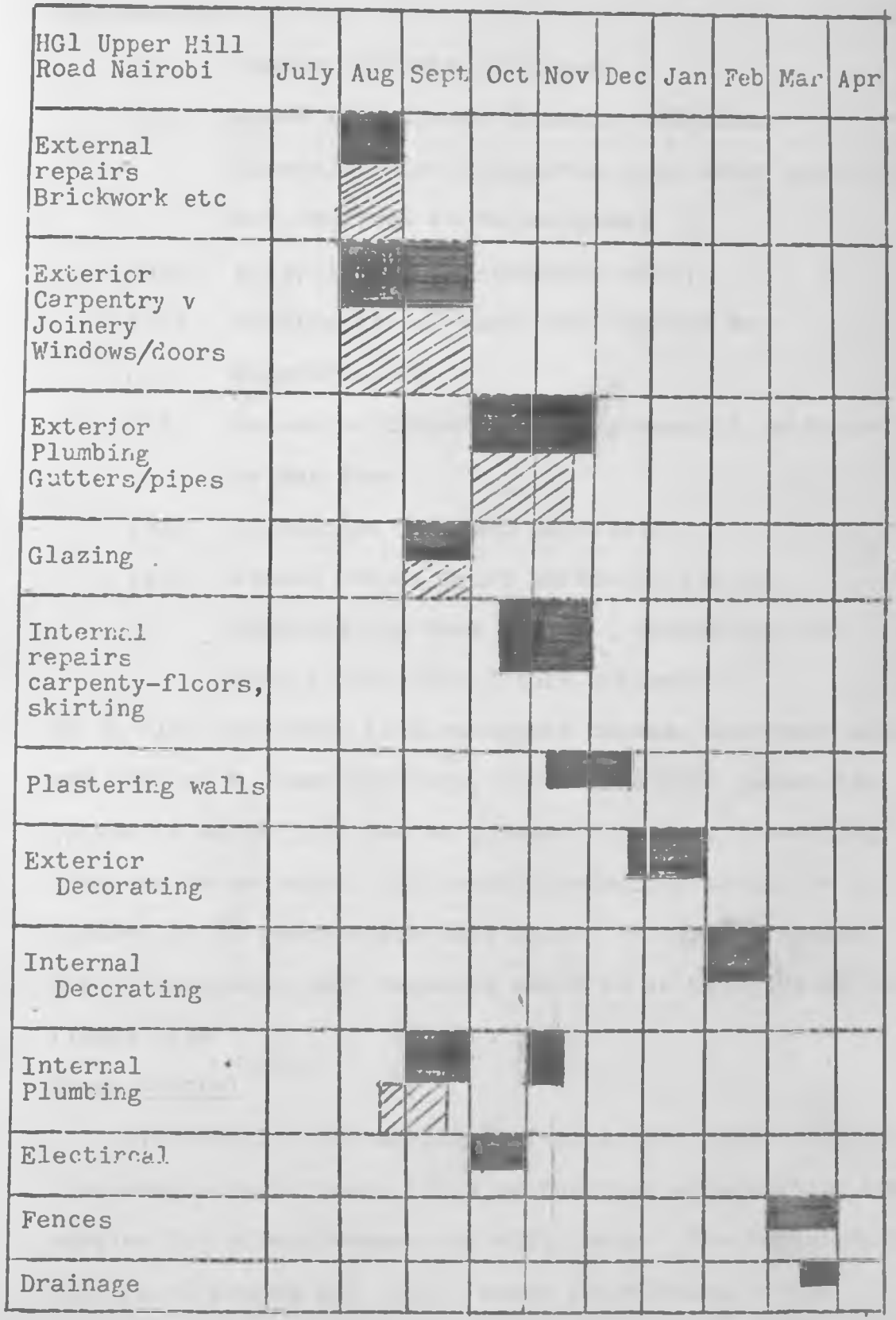


Figure 2.3 Short-term Maintenance Programme and Progress Chart.

can subsequently be analysed for various management purposes It is upto an organization to design a work order that fits its purpose but basically it should give the following information:

(i) number and date of issue;

(ii) codes to indicate location and other classification categories into which costs are required to be analysed;

(iii) priority for non-schedule work;

(iv) description of work which should be standardized;

(v) estimated labour hours expressed in manhours or man days;

(vi) quantities for each material;

(vii) actual labour hours worked on the job, required for cost control, bonussing, and also a basis for future estimates.

It is also necessary to distinguish between emergency work and that of a lower priority, since this will govern the extent to which jobs can be grouped to reduce travelling time and hence costs. All work carried out should be covered by an appropriate work order. A typical system for dealing with user requests would be as illustrated in figure 2.4.

Stock Control

Availability and adequacy of materials in the stores is a necessary requirement for a maintenance organization that strives for effectiveness and efficiency. The organization will first assess its stores needs in relation to its workload and types of jobs.

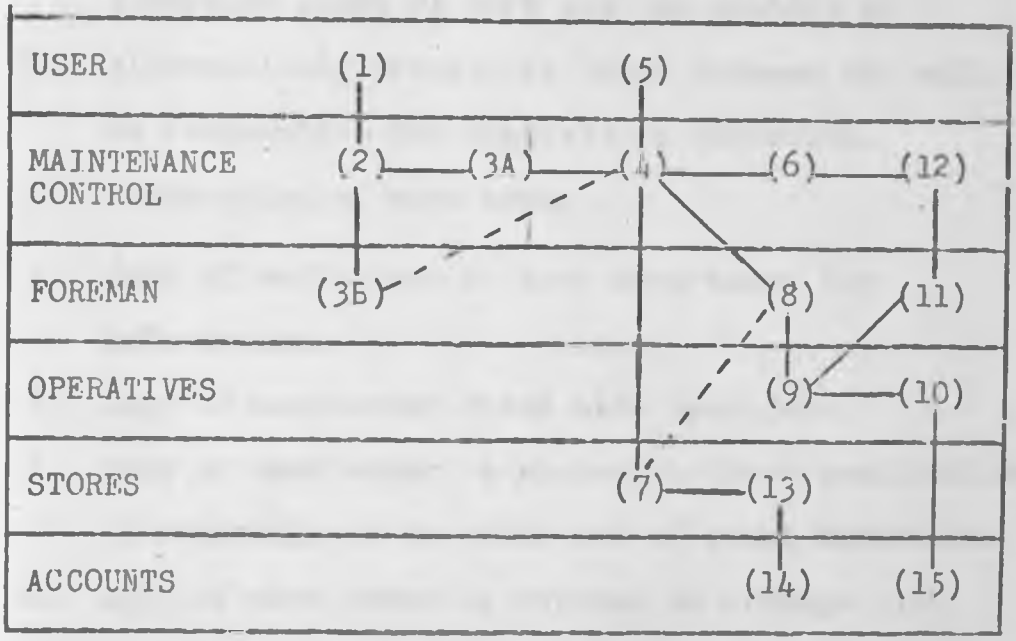


Figure 2.4 Contingency System for user requests.

Notes for figure 2.4

1. User issues request to maintenance control centre describing defect.
2. Request examined by maintenance control to check whether necessary, and if so priority.
3A. Preview of defect by building supervisor to determine scope of work and job method, or
3B. Alternatively preview by trade foreman who will be responsible for supervising execution.
4. Preparation of work order.
5. Copy of work order to user department for information.
6. Copy of work order filed with open jobs.
7. Copy of work order to stores to check availability of materials or to order out of stock materials.
8. Copy of work order to foreman to arrange with stores for delivery of materials to site at the programmed time.
9. Instructions to operatives on method of execution.
10. Operatives complete time sheets giving details of hours worked, overtime and non-productive time.
11. Foreman enters times for individual jobs on work orders and checks weekly total against time sheet.
12. Work orders for completed jobs extracted from job file. (At the same time, progress on incomplete jobs checked and jobs not started investigated).
13. Stores control procedures.
14. Accounting procedures.
15. Payroll.

It will then look at the ease or difficulties with which materials are obtainable from various supply sources and the overall cost consequences. Materials should be available as and when required for execution of urgent repairs. The economic quantity to be ordered may be calculated using the following equation:[24]

$$Q = \sqrt{\frac{2cd}{Sp}}$$

where Q = economic batch quantity

p = item cost

d = annual demand for item

s = stock holding cost expressed as a fraction of stock value

c = delivery cost per batch

When to order is determined by the following formula assuming lead time and average usage do not fluctuate:

Reorder point = Lead Time X Average Usage[25]

The lead time is the time normally taken in receiving the delivery of stock after the order has been placed.

The simplest system of stock control is the "two bin" system or "reorder level system". It involves noting receipts and withdrawals in an inventory and ordering replacements when stocks fall below a a predetermined level. An alternative system known as the "period review system" may be used where a series of items are obtained from a single supplier and it is desired to gain maximum quantity discount. This involves placing orders at regular intervals for quantities calculated to bring the total stock upto some

predetermined level.

All withdrawals should be on the production of a properly authorised requisition which should state clearly the description of the material, the quantity required and the work order number. A physical check should be made of the items in stock at periodic intervals in order to detect errors in the inventory records. At the same time the stock should be examined for obsolescence and deteroriation and if necessary disposed of.

Performance Measures

A maintenance organization should be able to measure its performance and take corrective action to improve on its performance. An organization that uses both directly employed labour and outside contractors should be able to compare the relative efficiency of the two. Two suggestions of making such a comparison was offered by a Department of Environment Working Party on Direct Labour Organizations[26] and a discussion document on Direct Works Undertakings Accounting (Maintenance) by the Chartered Institute of Public Finance and Accountancy.[27] Briefly the two suggestions are:

(i) The valuation of jobs on the basis of a Schedule of Rates derived from competitive quotations from private contractors. These rates are used for pricing work carried out by the direct labour force and the result compared with the actual cost of resources expended.

(ii) The charging of jobs by a system of Target Hours on the basis of a competitive cost per hour derived from contractors' quotes in terms of both time and price for a typical job.

These two methods especially the second one place high technical demands on a maintenance organization in terms of a comprehensive work study-based bonus scheme and a costing machinery capable of expressing work done in terms of the number of target hours or productive standard hours. However, the two systems are very important for a maintenance organization because they enable the organization to know its efficiency. By bringing direct labour into direct comparison with private contractors the organization would know if its direct labour is performing below the standard (set by contractors) so that the necessary steps can be taken to improve on their performance. The ministry has not done any work study and it will not be possible for this study to assess the efficiency of the ministry using any of the two methods.

There are many other performance indices discussed by Lee.[28] However, this study will consider only three of them namely; delay in executing work orders (backlog of work accumulated upto the end of the period in question), complaints from users, and consequential costs resulting from the organizations policies. In considering delay in executing work orders attention will be paid to the trend rather than the weekly figures.

Complaints from users will be obtained from the correspondence files. However, some of these complaints may be exaggerated and the study will therefore lay emphasis on a survey conducted to determine user satisfaction. Consequential costs resulting from the organization's policies will consist of extra costs incurred due to the established procedures.

The Structure

The foregoing discussion is the organizational (production) technology of a maintenance organization, big or small. In a small organization there could be a simple structure with the maintenance manager at the top with direct control over the operatives. The maintenance manager may perform most of the middle level activities (planning, estimating, programming etc) or he may hire services for these activities. He is close to the operatives (operating core) and there is room for innovation.

However, in a large organization there is no direct link between the maintenance manager and the operatives. The manager is linked with the operatives by a hierarchy of positions with the powers of each of the linkages clearly defined. Such is the organization this study is examining, MOWH&PP, Nairobi Province which is charged with the responsibility of maintaining more than 12,000 buildings with a replacement value of about K£498,791,149 during 1982/83 financial year.[29] The maintenance staff (operatives, supervisors, management etc) stands at over 1,000.[30] The province handles over 30,000 work orders

annually.[31]

It is also important to note that Nairobi province is not an independent entity but part and parcel of the maintenance branch under the control of the ministry's head office. The ministry is also part of the central government and as such its operations and structure must be tailored to fit into the national system. By its size and its larger envelope, the management must of necessity rely on formalization of procedures so that it can use impersonal means of control. With formalization, decision making can be pushed down to the lower levels without loss of control. The production technology of maintenance has shown that there are areas of specialization (planning, estimating, tendering and contract administration, bonussing etc) and this will determine the degree of horizontal complexity.

The building stock maintained by the ministry keeps on growing and as Daft puts it:

> beaucracy becomes important as organizations grow large and complex.32

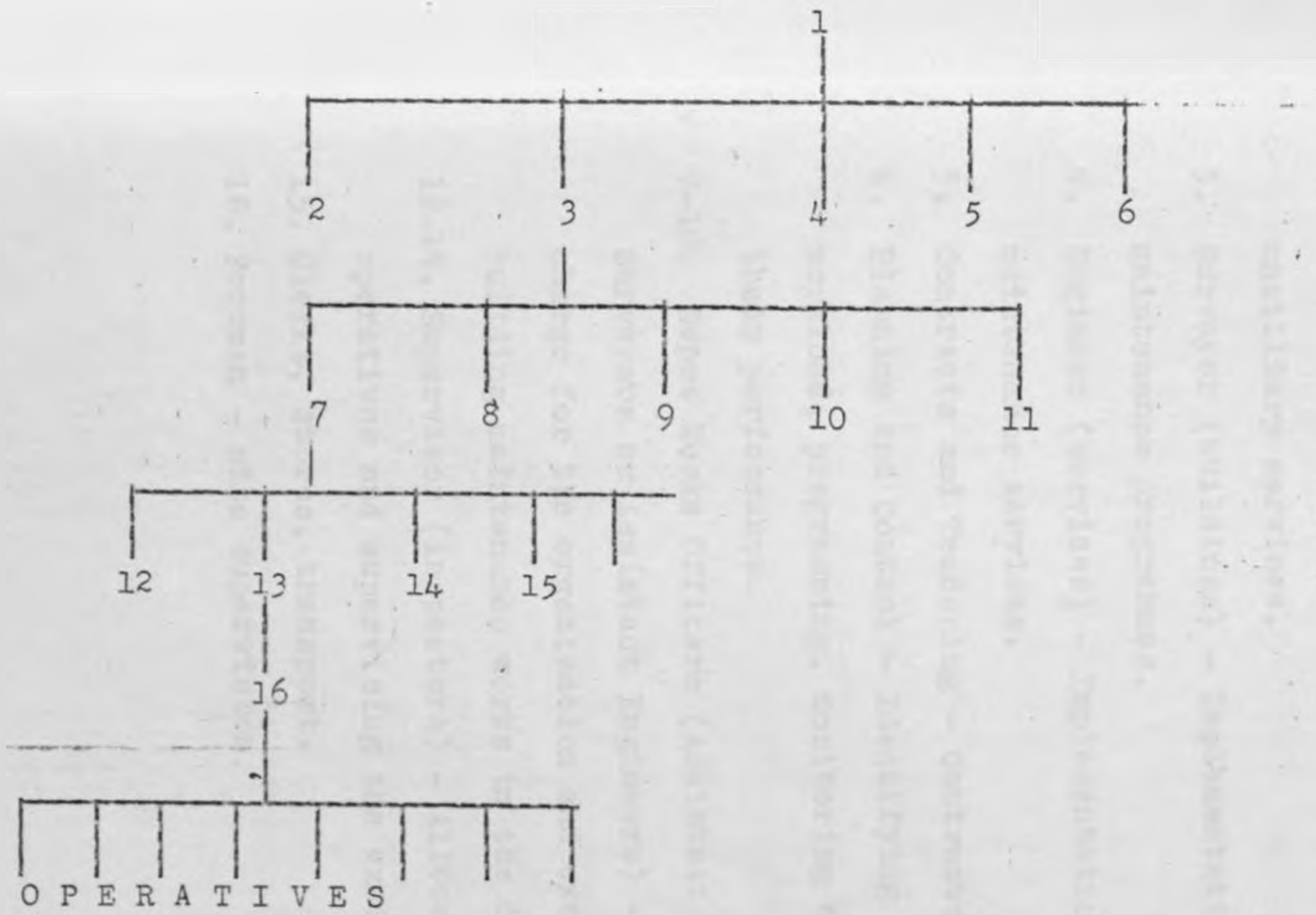
One factor to contend with is the external controls by the ministry's headquarters, Treasury and Controller and Auditor General. Mintzberg says:

> because external controls encourage bureaucratization and centralization, this configuration is often assumed by organizations that are tightly controlled from the outside. That is why government agencies which are subject to many such controls tend to be driven toward the machine bureaucracy structure regardless of their other conditions. 33

Machine bureaucracy has its problems like dull and repetitive work, alienated employees, obsession with control, massive size, and inadaptability. However, it is the

system that is suited to the organization that this study is examining. The system also enhances a great sense of harmony. With the five depots, the province should ideally have a structure that is geographically decentralized and since the work is carried out in the depots, as much authority as necessary should also be decentralized to enable faster decision making. The decentralized authority should be accompanied with accountability so that officers become responsible for their actions rather than hiding behind other officers which is common with centralized systems. Figure 2.5 shows the structure that this study considers ideal for the MOWH&PP Nairobi Province.

In our definition of 'organization' it was noted that the activities of the organization are integrated to achieve a common objective. In the above organization chart are seen various departments falling under the maintenance manager. Organizational success also depends largely on the harmony among its parts and how the activities of quantity surveyors, planners , engineers and administrators are coordinated in maintaining a sound built environment with maximum economy. Although the hierarchial coordination and administrative systems could have been sufficient for this organization, much more could be achieved through the formation of a committee that would convene from time to time to ensure that harmony exists among the various departments of the organization.



Note: Position 4 has got representatives in all the levels from 7 to operatives. 8-11 are similar to 7 and the downward hiearchy follows in the same manner.

Figure 2.5 Ideal organization structure for MOWH&PP, Nairobi Province.

Key to Figure 2.5

1. Maintenance Manager - overall in charge for the organization and execution of all building maintenance works.
2. General Administration - Personell matters, stationery, registry, transport and other ancilliary services.
3. Surveyor (buildings) - Implementation of building maintenance programmes.
4. Engineer (services) - Implementation of building maintenance services.
5. Contracts and Tendering - Contracts administration.
6. Planning and Control - Identifying the total workload, programming, monitoring and evaluating their performance.

7-10. Depot Works Officers (Assistant Building Surveyors or Assistant Engineers) - overall in charge for the organization and execution of building maintenance works in the depots.

12-14. Supervisor (inspectors) - Allocating work to operatives and supervising the execution.

15. Clerks, stores, transport.

16. Foreman - site supervision.

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CHAPTER THREE

ORGANIZATION OF MAINTENANCE WORKS IN MOWH&PP, NAIROBI PROVINCE A CASE STUDY

Introduction

Upto the year 1980 the Ministry of Works was composed of three major departments, namely, Roads, Buildings and Mechanical & Transport. The ministry was split leaving the buildings department in the ministry of Works with the other two departments going to the Ministry of Transport and Communications. The fact that the buildings department was the only major unit remaining in the ministry seemed to have sparked off the creation of new departments out of units that previously were sections within the department. The new departments created were:

(i) architectural,
(ii) contracts and quantity surveying,
(iii) electrical,
(iv) structural,
(v) general administration, and
(vi) accounts.

A government reorganization later split The Ministry of Housing and Urban Development with Housing moving to the Ministry of Works as a department. After the 1983 general elections, the department of Physical Planning also joined in so that now there is the Ministry of Works, Housing and Physical Planning (MOWH&PP).

Organization Structure

The building department's primary objective is to provide client ministries with suitable accommodation. It is responsible for rendering those services required to obtain the clients accommodation requirements, translate these into building designs and then carry out the construction and subsequent maintenance of the buildings. To carry out these responsibilities the ministry has an organization structure as shown in figure 3.1.

According to a recent advertisement in the local press for the post of the Chief Architect, one of his responsibilities was stated as maintenance of government buildings. This, however, seems to contradict the set-up since early 1984 whereby the head of maintenance services reports directly to the Permanent Secretary, meaning that it is a department separate from architectural. In the set-up where maintenance was falling under the control of the Chief Architect, the maintenance section was headed by Chief Superintending Architect (Recurrent). In the present set-up, maintenance has been combined with the housing section under the guidance of officer-in-charge Maintenance and Housing (O^{i}/c M&H) who is a Building Maintenance Surveyor. In itself, it is a move in the right direction so that decisions on maintenance are made by those who have undergone training in building maintenance management and therefore have an indepth understanding of maintenance. This study has therefore decided to use the structure depicting the present set-up.

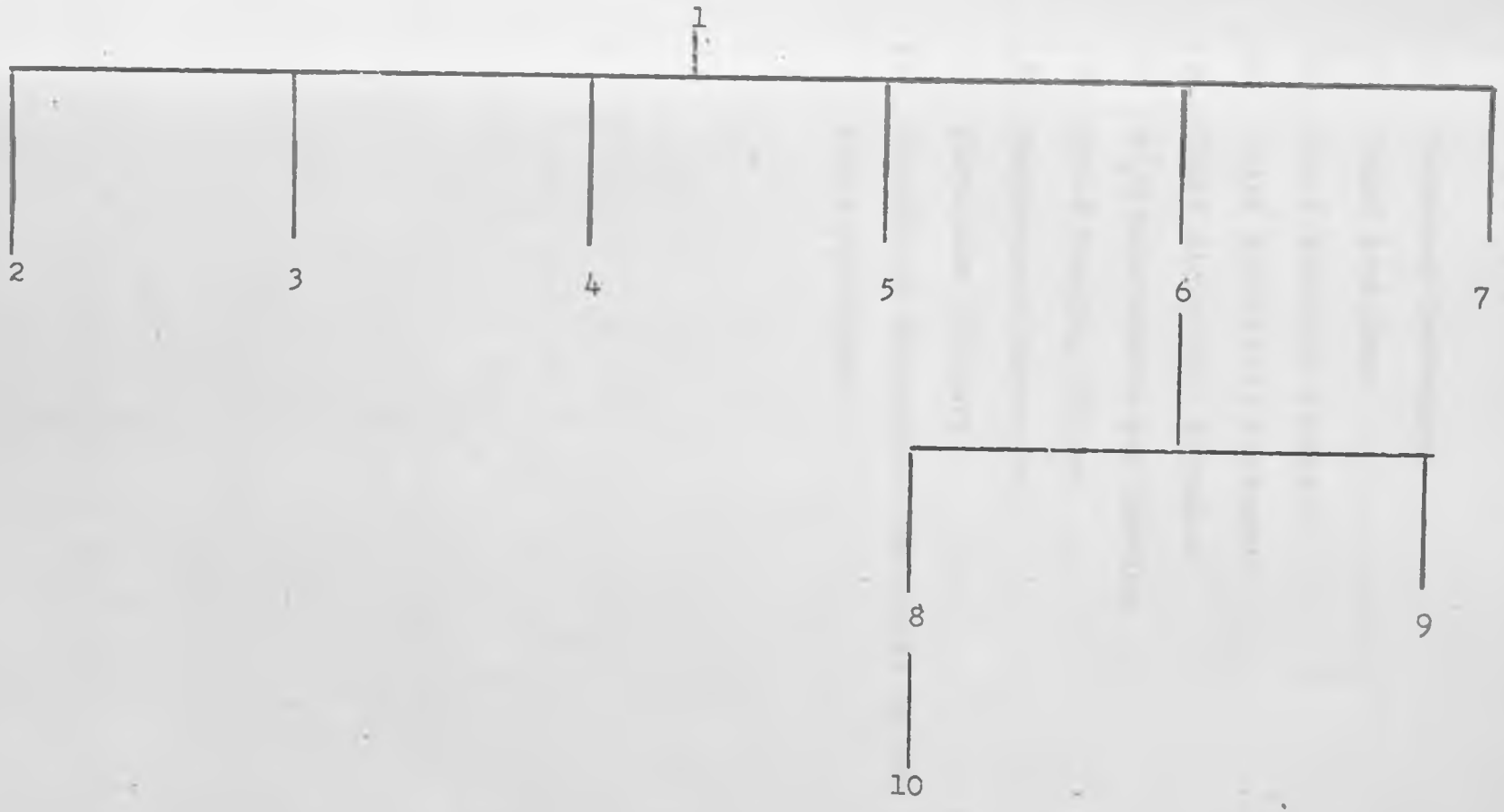


Figure 3.1 Ministry of Works Housing and Physical Planning Organization Structure.

Figure 3.1

1. Permanent Secretary
2. Chief Architect
3. Chief Quantity Surveyor
4. Chief Electrical Engineer
5. Chief Structural Engineer
6. O^{i}/c Maintenance and Housing
7. Chief Housing Officer
8. Maintenance Surveyors
9. Executive Officers
10. Provincial Maintenance Surveyors in the eight provinces

The alternative would be to shift the officer-in-charge Maintenance and Housing to fall under the Chief Architect as a Building Maintenance Surveyor. The shift is possible because the officer-in-charge, Maintenance and Housing is at present in job group "K" while the Chief Architect is in job group "N" thereby eliminating any friction that would arise due to job group rankings.

The departmentation shown in figure 3.1 is then transposed in all the eight provinces in the republic with each province headed by a Provincial Works Officer (PWO) so that in Nairobi we have a structure as shown in figure 3.2. Immediately below the PWO there are five departments namely development and minor improvements under the Provincial Architect (PA), Contracts and Quantity Surveying under the Provincial Quantity Surveyor (PQS), Maintenance under the Provincial Maintenance Surveyor (PMS), Electrical under Senior Superintendent Electrical (SSE) and finally General Administration and Accounts.

The province then branches out into five depots which as from July, 1980 were realigned to follow the government administrative boundaries. Table 3.1 shows October, 1982 building values broken down into the five depots. Kenyatta National Hospital and Kenyatta International Conference Centre depots were previously under the jurisdiction of the PWO Nairobi but are now semi-autonomous reporting directly to the Ministry headquarters. The depots are headed by technicians (inspectors or superintendents of buildings) except

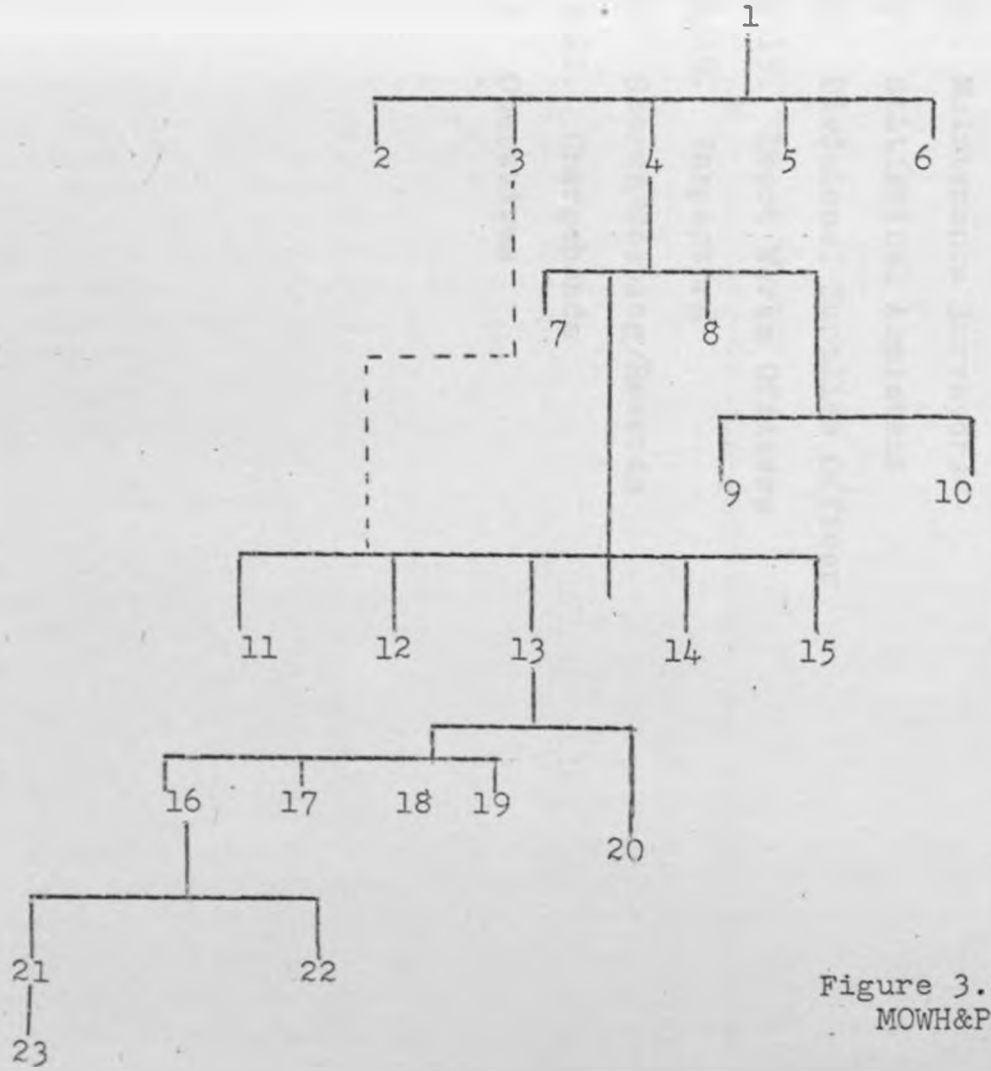


Figure 3.2: Nairobi Province
MOWH&PP Organization Structure.

Figure 3.2 Key

1. Provincial Works Officer
2. Provincial Architect
3. Senior Superintendent Electrical
4. Provincial Maintenance Surveyor
5. Central Administration/Accounts
6. Provincial Quantity Surveyor
7. Senior Superintendent Buildings
8. Maintenance Surveyors
9. Statistical Assistant
10. Divisional Supplies Officer
11-15. Depot Works Officers
16-19. Inspectors
20. Stores/Costing/Records
21-22. Chargehands
23. Operatives

DEPOT	BUILDING VALUES (K£)	PERCENTAGE
Park Road (Pumwani)	53,919,320	36%
Machakos Road (Kibera)	38,867,500	26%
Kahawa (Kasarani)	30,278,955	20%
Kileleshwa (Dagoretti)	19,703,355	13%
Embakasi (Makadara)	8,181,103	5%
TOTAL	150,950,233	100%

Table 3.1: Building Values, Nairobi Province
October, 1982.

Kileleshwa which is headed by a maintenance surveyor. They are all, however, designated Depot Works Officers (DWO). The building inspectors have undergone a 3-year diploma course at the Kenya Polytechnic covering subjects in:

(i) building construction;
(ii) theory of structures;
(iii) land surveying;
(iv) administration;
(v) measurement of building works; and
(vi) building drawing.

An inspector may be promoted to senior inspector of buildings, superintendent of buildings and finally senior superintendent of buildings. Some of the current inspectors and superintendents of buildings have not undergone the above mentioned training but have risen from artizan grade three, through charge hand to senior superintendents of buildings. The basic training of this group of technicians is therefore not suitable to proper administration and management of maintenance works and in the absence of in-service training, excellence would depend on individual intuition.

The first two maintenance surveyors were employed in the ministry in 1974 and were posted in the ministry's headquarters. The second lot of ten were employed the following year and were posted in various provinces. However, it was not until December, 1978 that a maintenance surveyor was appointed in Nairobi to head the maintenance section in the province.

Previously the senior superintendent buildings (SSB) was in charge of the unit with the maintenance surveyors assisting him in dealing with correspondence, surveying buildings for maintenance, programming and monitoring maintenance activities. The inspectors have been mainly in the depots responsible for allocation and supervision of maintenance work. After the taking over of the maintenance unit by maintenance surveyors the senior superintendents of buildings have been responsible mainly for supervising the depots especially with regard to contract works. They are overseers of inspectors who are directly responsible for the supervision of these works.

The depots are divided into sub-depots. Some of the sub-depots are established with offices like Langata Barracks for Machakos Road, Community building for Kileleshwa, Kenya Institute of Administration for Park Road and Thika Road Police Station for Kahawa. However, in some places they are just divisions for administrative convenience so that inspectors who are in charge of these areas are stationed in the main depots. Each inspector is assisted in allocation and supervision of works in their respective areas by charge-hands. Charge-hands are artizans who have been promoted through grades three, two and one. Artizans are assisted in the execution of work by subordinate staff who are keen on learning the various trades.

The depots also have support staff like storemen, stores issuers, costing clerks and recording clerks.

Storemen are responsible for ordering materials required for building maintenance. Generally, they order materials on instructions from the DWO or the inspectors. Materials are issued to artizans on approval by the DWO. The depot stores do not do any purchasing but only place their orders to the Divisional Supplies Officer (DSO) who is responsible for all materials purchases for the province. The DSO is stationed at the provincial headquarters and works under the PMS.

The central figure in building maintenance in Nairobi Province is the PMS. He and the SSE provide the link between the PWO and the depots. The PWO on the other hand provides the link with the ministry headquarters passing over policies down the ladder through the PMS and SSE. The PMS is responsible for:[1]

(i) Registration of government buildings.

(ii) Preparation of Maintenance works programmes (Five year programmes and annual works programmes).

(iii) Implementing and monitoring the approved annual works programmes and preparing statistical returns to the Chief Building Maintenance Surveyor (CBMS).

(iv) Maintenance staff matters including advising the PWO on recruitments.

(v) Organizing transport, tools and plant.

(vi) Keeping abreast with technical developments and arranging a provincial technical library to acquire suitable literature.

(vii) Providing technical advice to client ministries.

(viii) Procurement and control of maintenance stores in accordance with laid down government procedures.

At the provincial level these responsibilities would not seem to complete the systems approach circuit discussed in chapter two. The advisory role is not clearly spelt out here. However, a closer scrutiny will show that this role is in the hands of the CBMS who will interpret the statistical returns mentioned in (iii) above and then advice the top management accordingly. If his advice is acceptable to the top management, he will relay the new policy down the ladder. But the PMS should in the process of implementing and monitoring maintenance works analyse results achieved and advice the CBMS or PWO accordingly. So the PMS responsibilities are adequate as far as maintenance management is concerned.

All the maintenance surveyors are holders of bachelor of arts degrees in Land Economics from the University of Nairobi. They join the ministry as assistant maintenance surveyors and they are all expected to undergo an in-service post-graduate degree course in building maintenance management. Since October, 1981 the maintenance unit in Nairobi province has been under the management of a surveyor who has undergone such a post-graduate training. He is assisted by four to five assistant maintenance surveyors.

The organization structures shown in figures 3.1 and 3.2 do not conform to the model structure set in chapter two. The structures are not appropriate because service departments like the contracts & quantities and general administration are on the same level of authority with implementing departments like architectural and maintenance. Organization structure indicates the pattern of authority within it. The authority structure provides the basis for assigning tasks to the various elements in the organization and for developing a control mechanism to ensure that tasks are performed according to plan.[2] Harmony may be the key to success in organization but authority over the service departments is essential.

The model in chapter two shows that there is a maintenance manager with a surveyor (buildings))and engineer (services) below him. One would think that the ministry structure approximates this with the PWO being the maintenance manager and the PMS and SSE being the surveyor and engineer respectively. However, this study would like to reiterate that the post of the PWO is more of an administrative one with the appointees since its creation (1979) being an architect, technician, maintenance surveyor, architect and now a quantity surveyor. Except for the maintenance surveyor none of the PWO's has undergone any training in maintenance management and have had to learn the intricacies of maintenance in the office. The tendency has therefore been to leave the actual management of maintenance tasks to the PMS, the PWO just conferring with the PMS when there is a sensitive issue.

Whereas the PMS is given this central role in maintenance tasks (planning, implementing and monitoring), this responsibility is not given with an accompanying adequate authority that is necessary for effective execution of these tasks. The PMS does not have authority over the PQS who holds a key position in the implementation process. The PQS is responsible for preparation of the bills of quantities, tender documents, contract documents and payments. Infact after the PMS has identified the projects and carried out the surveys, he may be cut off the progress of a project as did happen in 1981. The PMS would in most cases be handicapped because he would have to give such answers as "I have played my part and I am still holding on for the PQS to play his part".

The bulk of maintenance work is carried out by outside contractors and it is inevitable that the maintenance manager should have authority over the contracts and quantities department. The major cause of the problem between the PQS and PMS offices can be assumed to be that they are both on the same level of authority and further that the PQS has either been on the same job group with the PMS or higher. The nature of work involved here does not need the high expertise of a graduate quantity surveyor. These works can be adequately handled by quantity surveyor assistants and this would help diffuse this consciousness on the level of authority related to job groups.

But even if the PMS has got institutionalised authority within his department, it is still not yet smooth sailing. Kast and Rosenzwig suggest that the institutionalized right to influence behaviour may or may not be effective depending on the consent of organizational participants.[3] They go on to quote Simon who suggests that the crux of the authority relationship is that a subordinate "holds in abeyance" his own critical faculties for choosing between alternatives and uses the receipt of a command as his basis for choice. In Nairobi province, one of the PMS's subordinates is an SSB. The SSB is senior in the civil service being in job group "K" as opposed to the PMS who is in "J". All maintenance surveyors including those employed in 1974 were placed in job group "J" and all except one are still in that very job group. This therefore gives the SSB latitude for dissent and this is not conducive to effective and efficient running of the organization. This dissent may be spread down the ladder especially among the technicians who belong to his cadre. It would therefore require the PMS to exercise his personal qualities to create harmony in the system. However, it is not an easy task taking into account that since the first maintenance surveyors were employed the SSBs have seen them as usurpers of their powers and authority. Harmony therefore hardly exists between the two.

In co-ordinating maintenance works it is also essential that the SSE should be to some extent answerable to the PMS. It is essential because in drawing the maintenance works programme there are aspects like electrical rewiring that should be followed by painting. In the absence of this co-ordination it would not be surprising to find Jogoo House being redecorated while the electrical department has programmed it for rewiring only six months after painting is due to be completed. According to the organization structure this kind of coordination should be provided by the PWO. However, taking into consideration the training of the previous PWO's, it is possible that this coordination could be completely lacking. It is therefore necessary to redefine the PWO's post to take over the burden off the PMS because in Nairobi more than 80% of the work is maintenance. Alternatively, the PMS could be elevated so that the service and component departments fall under him for effective planning and control of the overall tasks.

Apart from the maintenance surveyors who have a programme for post-graduate training in building maintenance management, the technicians and the artizans have no training programme at all. We have seen that the training given to the technicians is geared towards development works and as such they are not well suited to handle the intricacies of building maintenance. This is a major drawback and the absence of this essential training is likely to affect the efficiency and

effectiveness of the ministry's maintenance department.

The Nairobi province structure is therefore deficient because of failure to recognize where the weight of the tasks performed by the province lies. This has led to failure to provide the necessary authority to correspond to this weight of tasks. The structure shows geographical decentralization method of management. It should therefore be expected that adequate authority accompanies this decentralization as it is in the depots that maintenance work is executed. Availability of materials is a key factor in efficient execution of maintenance works. But we have already seen that materials are purchased centrally at the provincial headquarters. This is already a pointer that the decentralization shown in figure 3.2 is not accompanied with commensurate authority and responsibility.

Types of Maintenance Works

Building organization and operations manual (BOOM) defines maintenance as work involving the repair or restoration to the original or equivalent condition of a fixed asset. There is emphasis that this maintenance is carried out on permanent government owned or rented buildings listed in the MOWH&PP buildings register. The ministry has also introduced an element of cost in its definition of maintenance. It is stated that whenever restorations or repairs involved would cause by reason of improved materials, the total cost of building repairs to exceed by more than 25% the cost of restoration

to as-built condition with materials previously incorporated in the works or building then the work shall be defined as development work and not maintenance. Exceptions are permitted for those building repairs in which it can be established that the higher standards of replacements are attributable to a recognized code which forbids the use of materials or methods formerly acceptable.[4]

Like the definitions discussed in chapter two there is recognition that standards keep changing and that what may have been acceptable may be outdated with time. The introduction of the 25% cost ceiling is purely a control measure so that those who may require extra high standards would have to meet these extra costs from their development funds. Maintenance funds are voted to the ministry and if it were to fund the extra high standards then it would be eating deep into the maintenance funds which are always far from being adequate. So although works costing more than 25% as defined above may be termed development work, they are maintenance works and the term development is just an identifier of the source of funds (the client ministry).

For purposes of work planning and control there are three types of maintenance which can be carried out on permanent government buildings:[5]

(i) major maintenance jobs;

(ii) minor maintenance jobs;

(iii) maintenance of essential services.

Major maintenance jobs are defined as those items of maintenance whose cost in each case exceeds K£2000. Minor maintenance jobs are those items of maintenance whose cost in each case does not exceed K£2000. Maintenance of essential services includes the preventive maintenance of lifts, boilers, air-conditioning, refrigeration systems, electric pumps, generators, electronic equipment, fire prevention services, and electrical testing equipment. It also includes eradication of termites, the replacement of cookers, and the topping of or removal of vegetation likely to affect the stability of a building, emergency maintenance work caused by burglary, fire, extremely inclement weather etc.

In relating these types of maintenance to the types discussed in chapter two, it will be seen that major maintenance corresponds to planned maintenance, much of it being planned corrective maintenance. Some of the major maintenance jobs like reroofing and electrical rewiring can be placed under planned preventive maintenance depending on whether the ministry is aware of the life span of these components. Minor maintenance corresponds to the contingency (unplanned) system where the ministry waits for complaints from occupants and then executes the works. These are works identified and executed within a financial year and this is why the funds for this type of work is readily available with the PWO.

Essential services is just a distinction of convenience otherwise it also falls within the two types described above. However, much of the essential services falls more on planned preventive maintenance.

Major Maintenance Jobs

It is the PWO who identifies any potential major maintenance jobs. Normally such jobs are identified in the financial year preceding the one in which the work is to be done. The PWO instructs the DWOs to submit lists of projects/buildings that are due for major repairs and redecoration for the coming financial year. The duties of the PMS state that he should prepare the maintenance works programme to ensure that all the works are planned and phased within a period of five years assuming funds will be available to eliminate the backlog. The PMS should keep under constant review the maintenance works programme so that they are kept rolling forward on a five year basis. This kind of programme should make obvious the buildings to be included in the following financial year's Annual Maintenance Works Programme.(AMWP).

However, there has never been in the province a long-term programme from which the AMWP could be drawn. The DWOs usually list buildings whose occupants have raised complaints during the year. They also include buildings which the depot inspectors have noticed during the course of their supervisory work. This therefore means that only buildings that are reported by occupants or users or those that accidentally come to the

attention of the maintenance staff have a chance of being included in the AMWP. For the occupants who are not bothered by the condition of their premises, such premises may not be included in the AMWP for a long time, several times beyond the five year long-term policy set by the ministry.

The depots should forward the projects to the PWO complete with the estimated cost of each item and project. They may also identify the needy buildings and forward a list to the PWO who may use the services of the provincial headquarters based maintenance surveyors who will survey the buildings and then provide their estimated costs. The spending pattern of those costs and the priorities of the respective jobs are entered in a Project Submission Sheet (PSS-Appendix A). The PWO then submits the PSS in triplicate to the headquarters. The estimated cost should be used for control during the execution phase but generally the figures are inflated in anticipation of Treasury cuts and as such do not provide an effective control measure. At times when tenders are invited the lowest tender may even come to half the estimated cost.

The headquarters then vets the submission and if it qualifies as a bona fide major maintenance job, PSS's are filed pending the compilation of the subsequent years AMWP. Boom does not explain how the vetting is done but in practice it means that the headquarters should have a record of when the last major repairs and redecoration was carried out on each building and by cross-checking should be able to identify which buildings are due.

The headquarters should also have the long-term programmes for every province to help in this vetting exercise. The ministry does not have these long-term programmes meaning that the total workload has not been identified and as such has not been able to spread out its maintenance expenditure over the years. The actual funds required will therefore depend on what the province identifies and not what work should actually be carried out.

Upon receipt of all the PSS's for all the provinces the maintenance department headquarters shall draft the AMWP using the index shown in Appendix B. When the draft of the AMWP has been completed a tabulation of the jobs on the programme is made showing the total funds required. This tabulation is submitted to the Treasury as part of explanatory notes for the Draft Recurrent Estimates for the subsequent financial year. The Treasury reviews the submission and approves the total funds requested with or without revision. In the event that less funds are approved than were requested, the lower priority jobs on the programme will be postponed accordingly. Once the estimates have been published it is possible to determine if any jobs included in the draft programme need to be deferred.

Deferment of lower priority jobs has been inevitable due to underfunding. The extent of underfunding will be shown in chapter five. Considering that the AMWP prepared does not exhaustively cover all the necessary works in a given year, the provision of less funds than

requested from the Treasury means a greater backlog. However, the adequacy of funds is not the major concern of this study. The concern here is to find out how well the ministry's Nairobi Province utilizes the little funds that has been provided for its use. Whereas it is necessary to provide adequate funds if effectiveness is to be achieved, it would be a misdirection of resources if funds issued cannot be used efficiently to achieve effectiveness.

Minor Maintenance Jobs

It is the PWO who identifies minor maintenance jobs with the assistance of the occupiers. These may be identified by the occupant sending in a request for repairs to the PWO or the maintenance staff may during the course of their duties notice a defect which is then processed through the work order system as will be discussed later. Minor maintenance works do not form part of the AMWP but are identified and carried out at the discretion of the PWO during the course of the year provided the necessary funds are available. Such funds are allocated to the PWO half-yearly by the ministry's chief accountant on the advice of the CBMS. The total amount of funds requested from the Treasury is determined by the headquarters maintenance department on an analysis of current levels of expenditure and an assessment of the quantity of work outlined in PWOs maintenance inspection reports.

Maintenance of Essential Services

The Senior Inspector Mechanical (SIM) keeps a register indicating what equipments and plants they maintain. The register indicates where they are located. Under SIM is an inspectorate team made up of artizans and mechanical inspectors who inspect the equipments and plants every three months. An inspection chart (Appendix C) for each type of plant has been designed listing all its components. As the plants are inspected comments are noted down on the remarks column against each component. The comments state the condition of the component and whether it is due for immediate replacement or if replacement is due in two weeks, three weeks etc. The inspectorate team is also equipped with tools so that they may attend to some minor repairs.

On receiving the chart back from the inspection team the SIM will appraise the remarks. If the repairs to be carried out would seem to make the plant or equipment uneconomical (say more than half its cost) he would inform the client ministry accordingly and request that the client provides funds for its replacement. If however, it is not uneconomic to continue repairing, the details will be passed over to the maintenance team to do the needful.

On July one of each financial year the CEE authorizes the Chief accountant to issue one half of the total allocation of funds to the PWO for each essential service being maintained by departmental labour. The exercise is repeated on January one of each financial

year. If a repair costs under £250 the PWO shall authorize the work to be carried out as a minor maintenance job and charge the cost of the work to the appropriate minor maintenance works account. If a repair costs more than £250 but less than £2000 the PWO shall authorize the work to be carried out as a minor maintenance job upon receipt of an Authority to Incur Expenditure (AIE-Appendix D) for the funds required. He must therefore apply for the funds from the CEE who will arrange to issue a supplementary AIE from the reserve of fund for repairs to essential services held in headquarters. In cases of extreme urgency the requests can be made to headquarters by telex to the CEE after the PWO has given instructions for the work to commence.

If a repair costs more than £2000 the PWO must request that the jobs be added to the AMWP for the province by submitting a completed PSS to the CEE. He suggests which other item on the works programme can be deferred to provide the necessary funds. The PWO also requests the necessary funds by submitting an Application for Funds Forms (AFF - Appendix E) to the CEE through the CQS. Generally the jobs to be deferred to give way for such urgent ones are low priority jobs as shown in the PSS priority column. Such are jobs whose postponement for a few months would not adversely affect the plant in question. The PWO may have to use minor maintenance funds to attend to some components in the plant during the postponement period.

One of the first practical steps for any person setting up a planned maintenance organization is to make a general appraisal of the whole situation, surveying the task in hand and the available resources. A tentative approach is then worked out so that the fundamental principles can be applied in the method and manner best suited to the circumstances.[6] The mechanical section seems to have had a grasp of this but the same cannot be said of the building maintenance section because without the long-term programmes then they have no appraisal of the whole situation. They cannot therefore relate the work at hand with the resources available and to be able to forecast their future resource requirements. Furthermore planned inspections should be a must for service tenancies because tenants without personal sense of pride and care will not care how badly property deteroriates. This can be worse where surcharge is not levied strictly. Surcharge should be levied as stipulated in the civil service code but it is rarely levied.

The absence of planned maintenance will therefore reflect ineffective use of resources. The advantages of planned maintenance like improved budgetary control will be absent. The study has stated earlier in this chapter that the AMWPs generally fall short of what is required of them i.e they fail to identify work that is actually due and that the estimates are at times over inflated in expectation of Treasury underfunding.

But this is a budget that should reflect the management plan of action for the next one year. If the Treasury provides less funds than required this should be documented and recorded so that the extent of underfunding can be reflected throughout the long-term period. The ministry is also not likely to have a good stock control system because without planned maintenance the decisions on the quantities of materials to be ordered are likely to be arbitrary. Other decisions and forecasts are also likely to be inaccurate and unrealistic.

BOOM is silent about standards. The study did not find any conscious setting of standards by the ministry. The ministry operates a contingency system whereby there is heavy reliance on occupants to report nearly all defects. This contingency system therefore means that many defects are likely to be in the properties especially those whose occupants are not sensitive to the condition of the premises. The incoming work will also be irregular thus making it difficult to plan and if consciousness to plan is non-existent among the management then the backlog will continue to build as time goes by. The lack of set standards either by way of regular inspections to determine if the condition of the building has fallen below requirement or regular executions (replacement or repair) based on predictable component failures shows lack of direction on the part of the maintenance department. The management does not set periodic

targets at which to aim and through the control mechanism readjust the working system to achieve the set standards. It is therefore likely that efficiency is lacking because there is no consciousness to achieve it and if the data to be displayed in chapter five show efficiency it would be purely an accidental achievement.

Other than the defective and "prepared for the sake of it" AMWPs there was no evidence of short-term programmes that would assist the management in the execution phase. Contract and direct labour jobs are not allocated to the particular times of the year when they are expected to be executed. Although it could be argued that the long head office procedures through which the tender documents go might mitigate against the realistic programming of such work, it can on the other hand be countered that through time observation of records the provincial management can emphatically raise an objection to these unnecessary procedures by showing how these procedures contribute to their failure to execute works as programmed. Lack of short-term programmes for direct labour is also likely to result into poor inventory management, high labour-on-cost due to the likely gaps in between jobs. No major maintenance jobs have been programmed for the direct labour force since 1979 thereby limiting the direct labour to day-to-day maintenance works. This is also not consciously done for as has already been discussed, there are advantages of using direct labour in some jobs, not necessarily minor maintenance works.

Integration

As with the whole civil service integration is achieved through formal procedures designed to carry out much of the routine work. There is extensive use of internal memos and letters. The memos and letters in files with routing slips are centrally controlled by the registry under an office superintendent. All letters from within and without the province are all routed to the registry where they are slipped into a folder and then forwarded to the PWO. The PWO then reads all the letters and annotates on the letter the relevant head of section to deal with the letter. The letters are then returned to the registry and each letter is now filed in its relevant file (e.g. House number Higher Grade 1-HG1 or Middle Grade 20 - MG 20 etc). The registry clerks then enter on the record sheet or routing slip the date and head of section to whom the PWO annotated the letter. The file is then placed in the pigeon hole for the head of department awaiting a messenger from the department to pick it up.

When the head of department, say the PMS receives the file he will delegate the responsibility of dealing with the issue raised in the letter to an assistant maintenance surveyor. Each surveyor covers at least one depot so that all maintenance issues relating to a particular depot are chanelled to the surveyor in charge of that depot although they are stationed at the provincial headquarters. The surveyor then passes over the issue to the DWO in writing. The DWO (each depot

has got its own filing system) will then mark the letter to the inspector in charge of the area in question. Finally the inspector will organize the execution of the work. If it is a policy issue from the head office it will be communicated through the same procedure. The routing slips have got a "bring-up date" column so that if say a maintenance surveyor wants to follow up a complaint, he will specify on the column the date on which he wants the file back.

The process described above is too long for maintenance work because some repairs become more expensive the longer they stay unattended to. A letter posted in Nairobi may take more than thirty days before its contents are finally communicated to the inspector who is responsible for organizing the execution of the work complained of. A depot like Machakos Road is located within the same compound with the provincial headquarters with the maintenance surveyor drafting the letter to the DWO just about ten metres away and yet such a letter would take even seven days to reach the depot. The motive behind such a procedure is to have everything in record. However, this study feels that it would be time saving if a maintenance surveyor would walk the ten metres to the depot to have the complaint recorded in the work instruction book, take down the work instruction number and then follow up with a letter requesting feedback. The slow movement of letters is further aggravated by the fact that some files cater for certain areas and not individual properties (e.g. Rented

Houses in Kileleshwa Area). In October, 1982 there were nearly three hundred rented houses in Kileleshwa area. Obviously the number of complaints must be numerous. Such files therefore become "high motion" files so that the rate at which letters come in is higher than the rate at which they are dealt with. In practice, such a file will be marked to an officer but before he is able to deal with it, it is recalled to the registry or rerouted to another officer altogether. At the same time the registry personnel pay very little attention to the "bring-up date" column so that reliance on it by the officers is greatly misleading.

The stable organization can rely upon the hierarchical structure and established procedures to ensure cordination.[7] But it has been seen that the administrative system for Nairobi Province is slow in transmitting information down and up the hierarchy thereby having a poor vertical linkage. The departmentation is such that it would not require a full-time integrator for horizontal integration. Memos, reports and direct contact between heads of departments would suffice. Reports if any are filed and routed to all departmental heads. Established procedures as a means of ensuring coordination may also be abused by neurocrats as was evidenced in 1981 when the PQS of the time decided to call tenders, instruct contractors to go to site, release payments to contractors all without the "project managers" (PMS) knowledge.[8]

The PMS is the implementor and controller of all buildings maintenance projects and the Departmental Expenditure Authority (DEA) holder and should be knowledgeable about the progress of every job and must be a signatory to all payment vouchers for such projects. Such actions by the PQS only fuels the already existing confused state of affairs. It is understood that the PWO did not step in effectively to correct the situation and this violation of procedures continued for sometime thereby disrupting the PMS's records. The PMS on the other hand decided not to forward any new works to the PQS thus causing the work to suffer.

Regularity of heads of department meetings as a way of integration and control has depended on the various PWOs. The first PWO for example held only two meetings during his tenure of more than a year. The subsequent PWOs held more meetings but they have all been lacking in positiveness. The same issues tend to be the centre of discussions in these meetings without any evaluation being done on the success or failure of the previous meetings' resolutions. The issues that keep recurring are transport, purchasing of materials, supervision of maintenance works, staff requirements and discipline.

It is finally observed that the organization structure for the ministry's Nairobi Province is defective so that the central position in maintenance does not have institutionalized authority over service departments. It also does not lend itself to a smooth

union between component departments of electrical and buildings. There is therefore no team work so that each department seems to operate independently without the much needed coordination and the setting of common goals at which the whole provincial team would aim. Lack of planned maintenance would mean that the system the ministry is operating is a contingency one and as such it is likely that the resources will be used ineffectively. The absence of consciously set standards indicates that there is no control mechanism within the system and that there is no desire to assess if their performance at any given time is efficient and effective.

FOOTNOTES

1. Republic of Kenya, Ministry of Works, Housing and Physical planning, Standard Appointment Letter for Maintenance Surveyors.

2. F. E. Katz and J.E. Rosenzwig, Organization and Management, A Systems Approach (New York: McGraw-Hill Inc., 1970), p. 173.

3. F.E. Katz and J.E. Rosenzwig, Organization and Management, A Systems Approach, p. 319.

4. Republic of Kenya, Ministry of Works, Housing and Physical Planning, Building Organization and Operations Manual, (Nairobi, 1970), Chapter 9 section 1.

5. Republic of Kenya, Ministry of Works, Housing and Physical Planning, Building Organization and Operations Manual, Chapter 9 section 2.

6. R.H. Clifton, Principles of Planned Maintenance (n.p.: Edward Arnold Publishers Ltd., 1974), pp 12-13.

7. Katz and Rosenzwig, Organization and Management, A Systems Approach, p. 188.

8. Republic of Kenya, Ministry of Works, Housing and Physical Planning, File Number DG. 10, (Nairobi, 1981).

CHAPTER FOUR

EXECUTION OF MAINTENANCE WORKS IN MOWH&PP, NAIROBI PROVINCE A CASE STUDY

Introduction

After the construction of the building and the contractor has been issued with a Certificate of Making Good Defects, the project architect forwards to the PWO the details required for the Building Register (Appendix F). The statistical assistant in charge of the Buildings Register unit then registers the building. The building at this stage has been handed over to the maintenance department and maintenance works may now begin. Maintenance works whether major, minor or essential services are carried out by directly employed labour or contract labour.

By Contract Labour

MOWH&PP maintains a register of approved contractors. The register contains a list of all contracting firms authorised by the ministry to carry out the construction or maintenance of government buildings. The register is maintained to ensure that only competent contractors are engaged to carry out construction or maintenance of government buildings. Any contractor who wishes to undertake work for the ministry may apply for registration as a MOWH&PP contractor. A firm wishing to be so registered must complete an application in the form set out in Appendix G and submit it to the Permanent Secretary

for Works through the relevant Provincial Works Officer (PWO). The contractors will then be classified by work type, complexity of work, province, value and status.

A firm may be upgraded or downgraded from one category to another or struck off the register if it ceases to fulfill the conditions of registration or if it proves unsatisfactory in its contract relations or otherwise forfeits confidence. A confidential report and any other reports on a contractor should be submitted to the Chief Quantity Surveyor (CQS) who shall be responsible in conjunction with the other members of the registration committee for reviewing the reports for upgrading, down grading or cancelling the registration of a firm.

There is a lot of information required in the application which apparently do not seem to count in as far as qualification for registration is concerned. What has been seen to be the requirement that counts is the works that a contractor has carried out in the last five years. Many building works are carried out without documentation and there is nothing that would stop an aspiring MOWH&PP contractor to take whoever is inspecting these works to a friend or relative's house and say that he painted that house a couple of years ago. This has led to every Tom, Dick and Harry who has learnt that trick to get to be an MOWH&PP approved contractor. Not much attention is paid to other requirements like whether a contractor is or not registered with the National Construction Corporation (NCC) which is responsible for among other things the

training of African contractors.

A good percentage of the contractors are part-timers who engage in the business as an extra source of income.[1]. They are not committed to the sub-industry and will"sit on the fence" during the lean periods. This is a big blow to the sub-industry as it shows lack of togetherness among the contractors. The Kenya Association of African Contractors is supposed to create this unity but the ministry has not played a positive role by insisting that contractors join the body. A strong association would benefit the ministry in that the mass underpricing of tenders could be cut down because the contractors that suffer as a result of this undercutting would table such an issue for discussion by the association. This may prompt the association to organize in conjunction with NCC and the ministry some courses or seminars for the contractors; the courses and seminars would enhance their understanding of contracting business and hence their productivity. At present their productivity is likely to be low due to their ignorance of the trade and lack of positive unity. So apart from laying emphasis on what works a contractor has done in the past five years, more attention should be laid on the contractors' ability to understand the basics of contracting and more so in bidding and project management. For the purposes of this study these should be the basic requirements for a good contractor. The financial status of a contractor, equipment and transport owned are also important but should not be

overemphasized. Although they are an added advantage they should only be considered when selecting contractors for particular jobs because interim payments and guaranteeing payments to merchants who supply contractors with materials can always see a well organized contractor with little finances through a modest job.

Tendering and Acceptance

At the beginning of a new financial year the Provincial Maintenance Surveyor (PMS) picks on a few jobs on the AMWP (jobs deferred from the previous year or the first priority jobs in the new year) and sends out the assistant maintenance surveyors working under him to survey the buildings that constitute the projects in question. The maintenance surveyors then prepare the necessary specifications which are then forwarded to the Provincial Quantity Surveyor (PQS) who together with his staff prepares the tender documents. According to BOOM (chapter six section 14) the PQS suggests a tender list from the register of contractors. The contractors are selected on the basis of cost, complexity and location of work. Normally the list contains at least 12 names. The list is submitted to the PWO for his approval. After approval, tenders are posted or collected by contractors from the contracts office. A locked tender box in which tenderers must place their tenders not later than the time and date stated in the invitation to tender is fixed in a prominent place in the contracts office.

After opening, tenders are examined to ensure that the prices are reasonable and that the documents do not contain serious errors or omissions which are likely to render a contract if entered into open to failure. Tenders are examined by the PQS or his assistants using the rates prepared by the ministry's cost planning unit. The general practice is that if the lowest is found to be too low the PWO will write to the contractor asking him to withdraw or confirm that he stands by his tender figure. If the contractor confirms that he will stand by his tender figure, the offer will be accepted.

As Lee puts it, the submission of the lowest tender does not automatically indicate that the contractor submitting that tender is the most efficient of those tendering. A low tender may be the result of inaccurate estimating or of a shortage of work in the locality or it may be set deliberately low with the intention of cutting down the quality of workmanship.[2] The ministry seems to to recognize this yet it boldly allows contractors whose tenders they know are faulty to take site. This not only makes the administration of such contracts difficult but more expensive too.

On works less than £5000 the PMS should prepare a covering Tender Report (Appendix H) which is then submitted to the PWO together with the Schedule of Tenders Received for his approval. For works over £5000 the PMS should prepare the Tender Report for the PWO's signature.

It is then forwarded to the Officer-in-charge Maintenance and Housing (o[i]/c M&H) with the Schedule of Tenders Received. A copy of the foregoing is also sent to the CQS together with the tender documents and an Application for Funds. (AFF)

Negotiated Contracts

A negotiated contract is one for which the contract amount is determined by a process of negotiation with a contractor rather than through a process of competitive tendering by a number of contractors.[3] Negotiating contracts is one method by which the government is endevouring to create an African-based construction industry in Kenya. A contract may be negotiated directly with an African contractor. However, the Chief Secretary in 1981 felt that negotiated contracts have served their purpose and should be discontinued.[4] Any negotiations thereafter must be approved by the Treasury except for jobs less than Kshs. 10,000/-.

Negotiations should not have been seen only as an instrument for building an African-based construction industry. Rather, its advantages should be appreciated and exploited appropriately. Negotiation "permits a greater involvement of the contractor during the design process and perhaps speedier completion and better quality work."[5] Indeed negotiations have been mainly for repair and redeccration works for rented buildings whose leases have expired and must be handed over to the landlords by a given date.

Many of such works cost more than Kshs. 10,000/- and reference to the Treasury would defeat the purpose of beating the deadlines set. Most landlords are very particular about the quality of workmanship and with the policy of accepting even faulty tenders such works are bound to drag as the contractor strives to make profits by giving low quality workmanship or scouting for extra works on items that would boost his profits.

Negotiations with African contractors for jobs costing less than £5000 are carried out by the PWO. Jobs costing more than £5000 are negotiated at the head office by Negotiated Contracts Officer (NCO) even if it originates from the PWO. For both cases the PWO must seek authority from the PS through the c^{i}/c M&E to negotiate the job in question with an African Contractor. The PWO states the reasons why the job should be negotiated rather than being tendered. The reasons usually given are urgency and the quality or workmanship required. The PWO lists three African contractors and recommends one of them stating why he should be most suited to the job.

Once authority has been granted to the PWO, the PQS in conjunction with the selected contractor determine the tender amount based on standard rates prepared by the cost planning unit. Where the job costs more than £5000 the PQS will only prepare the Bill of Quantities and forward it to the NCO who will in conjunction with the contractor determine the tender amount. A Tender Report

and an AFF are then filled and submitted to the o^{i}/c M&H through the CQS. The PWO authorises the acceptance of all tenders worth less than £5000. All tenders worth more than £5000 are authorised by the Permanent Secretary.

An AFF is a document which describes in detail the exact financial requirements for one or more items in the AMWP. An AFF is prepared as soon as the exact amount of money (over £2000) required to carry out the work has been determined by the appropriate contractual procedure. Upon receipt of a verified AFF from the CQS, the o^{i}/o M&H requests the Chief Accountant to issue an AIE (Appendix D) to the PWO for the job. An AIE is a standard form which authorizes the vote holder to spend the funds. The vote holder is the person who will control the expenditure on the job concerned. The vote holder is usually identified on the AIE and it is usually the PWO for maintenance jobs. The chief accountant issues an AIE bearing an account number of the following type:

(0)-409-XXX-254 (V) Z

where XXX is assigned serially and identifies the job, (V) is a check digit and Z is the alphabet character identifying the AIE.

This maze of procedures can be summarized as follows:

(i) all jobs costing less than £2000 can be accepted by the PWO without being referred to the head office;

(ii) all jobs costing more than £2000 but less than £5000 must be processed through the CQS's office and forwarded to the o^{i}/c M&H for funding before being brought back to the PWO for acceptance and supervision;

(iii) all jobs costing more than £5000 must be processed through the CQS's office and forwarded to the o^{i}/c M&H for funding and then to the permanent secretary for acceptance and then back to the PWO for supervision.

Although rules and procedures are mechanisms through which managers coordinate and control the entire system it should on the other hand be borne in mind that these mechanisms should not be too long so as to water down efficiency and effectiveness. Bampton[6] states that lines of communication in a maintenance organization should be short and effective. When we talk of documents being processed through the CQS's office, they do not pass through one officer but several officers before going through several officers again in the o^{i}/c M&H's office. This has resulted into the duration between the date of submitting tenders and commencement of work to be uncertain hence making it difficult for the provincial management to plan for the execution phase. A random sample of 18 jobs in 1983/84 showed that this duration varies between 15 days to 163 days, with the average coming to 49 days. Ideally this duration should be 14 days.

The rules and procedures displayed here also mean that when there is a breakdown in the chain it would not be uncommon for officers to start "passing the buck" to fellow officers. It therefore becomes difficult to pinpoint the exact area of weakness in an attempt to make good the deficiencies in the system. Generally if there is a delay in executing a job the blame would go down to the PWO who is responsible for the implementation of the project and yet the PWO does not have control for the most part of the processing of the project. The head office and more so the CQS's office is far away from the occupants and have no feeling of urgency for any of the jobs.

Probably the o^{i}/c M&H's office may have a feeling of urgency because failures of the maintenance team would fall on it. But even they do not have authority over the CQS's office and if they cannot use diplomacy to hasten the processing of the documents then they would have to wait for the documents to take their "natural" course in the CQS's offices before they can finally request the chief acccuntant to issue funds to the PWO. Further, the weaknesses in vertical integration potrayed in the PWO's office is also common in the head office and as one senior officer in the architectural department on the twelfth floor once said, "letters from this floor at their best travel at the rate of one floor a day." What of the common happenings of documents getting lost or misplaced? This maze of procedures therefore results into nothing but unwarranted delays

thus resulting intc losses that may be directly related to them.

Contract Procedures

Contract documents retained by the PWO (original) or by the CQS for jobs costing more than £5000 and the contractors record copy contain the following:

(i) Articles of agreement signed by both parties.

(ii) Conditions of contract appropriate to the work being carried out i.e. with or without bills of quantities or for minor works.

(iii) Priced bills of quantities or a specification signed by both parties.

(iv) Surety Bond signed by the surety (for contracts over £5000 only).

(v) The form of tender submitted by the contractor, and

(vi) A copy of the letter of acceptance signed by the PWO or the permanent secretary.

The departmental representative's (usually the PWO) copy of the contract documents contains only the bill of quantities or specification, the articles of agreement and the conditions of contract. Contract documents for all jobs over £5000 are prepared by the Contracts Documents Office (CDO) in the head office. For jobs costing less than £5000 the contracts documents are prepared by the PQS. Again here there is nothing technically more involving to warrant contracts of over £5000 being prepared in the head office instead of the province.

Copies of the acceptance letter and the bill of quantities or specification are filed in a project file which is then marked to the PMS. The PMS informs the DWO under whose jurisdiction the job falls to hand over site and supervise the works as necessary. This information is also relayed to the SSB who is responsible for coordinating supervision. The DWO may delegate the responsibility of handing over site and supervision to a building, electrical or mechanical inspector depending on the type of job.

Boom states the supervisor's (inspector's) responsibilities as follows:

(i) Site organization and management

(a) Ensuring that the contractor has got a competent foreman on site.

(ii) Contract documentation

(a) checking all copies of MOW General Specification, any bills of quantities and/or particular specification are on site and that adequate arrangements are made for their filing and protection.

(b) Study the contract documents and report any apparent errors, omissions, discrepancies and ambiguities to the DR.

(c) Keep accurate records of all provisional items.

(iii) Quality of Workmanship and materials.

(a) Examine all workmanship and materials

(b) Draw the contractors attention to any shortcomings and if he does not rectify them, report the matter to the DR.

(iv) Site instructions.

(a) Prepare and sign site instructions covering variations in the work or specific instructions to the contractor. Site instructions (Appendix I) must be countersigned by the DR before being issued to the contractor.

(b) Where a site instruction will give rise to a change in the cost of the works, an estimate of this change must be made and recorded on the QS's copy of the site instruction before the DR's approval to issue the same is requested.

(c) All site instructions involving a variation in the cost or duration of a contract shall be covered immediately by a Variation Order (VO - Appendix J) which is the only document which officially varies the terms of a contract.

The MOWH&PP administration feels that site instructions have been misused by the supervisors. This led to a directive from the head office that financial variations must be approved by the permanent secretary. The directive has however been interpreted differently.

The ministry largely uses lump sum contracts with provisional sums for works not foreseen during the surveys. Some officers hold that so long as the extra works can be covered by the provisional sums then there is no authority required from the permanent secretary while others hold that even such extras must be approved by the permanent secretary. Other than the fact that no survey can be 100% perfect, a building's condition continues to deteriorate and with the maze of procedures before a contractor finally takes site there must be some new defects. Referring these extra defects to the head office would only help to frustrate these projects as some of the extra defects may require that they be done before some of the original works are done.

But even before this directive, the extra works procedures were frustrating. Going back to the deficient vertical integration a site instruction originates from the supervisor to the DWO. After the DWO has vetted the site instruction he forwards it to the PMS who may ask the maintenance surveyor who carried out the original survey (if it is suspicious) to go to site and confirm the defects are really extra. From the PMS it is forwarded to the PQS for pricing. If no extra funds are required the PWO will sign it before it is released to the contractor. If extra funds are required then the PMS must apply for the extra funds from the o^{i}/c M&H, through the CQS. The site instruction will not be released until the extra funds are received by the PWO.

We have seen how long the route to issue of funds is. It is frustrating especially if a contractor has finished all the other work or the extra has to be done before the other works and has to hold on site for the site instructions.

The supervisor is expected to keep a site diary and to submit site weekly reports (Appendix K) to the PMS which will help the PMS evaluate the progress of the job. Incase a contractor requires an interim payment the site weekly report may be used to estimate the payment due. However, the practice is that a quantity surveyor assesses the exact amount of work done on which the payment will be based. When the supervisor is finally satisfied that the contractor has executed all the specified work, he prepares the practical completion certificate (Appendix L) which will be countersigned by the DR before the final payment can be prepared.

Most contractors depend on materials whose payment is guaranteed by the ministry. They also depend on interim payments to progressively help them complete the jobs. It is therefore important that this study describes the processes through which the payment undergoes. The quantity surveyor responsible for the job prepares a statement for payment on account (Form MOW 121 - Appendix M) and a summary of the statement (Form MOW 123 - Appendix N). The rest of the procedures are as follows:

(i) The contractor signs the form MOW 123

(ii) The PQS prepares and signs a payment voucher (Form FO 20 - Appendix O).

(iii) The PMS signs the form FO 20 only and records the payment on the Progress Sheet (Appendix P) again giving him an opportunity to evaluate the progress of the job. If the PMS is not satisfied with the progress of the job he may instruct the PQS to prepare a letter for the PWO's signature giving the contractor seven days notice to show progress on the job.

(iv) The documents are then passed to the Divisional Accountant who notes the liability in the appropriate ledger.

(v) The documents are sent to the PWO who signs form MOW 123 and FO 20.

(vi) They are returned to the Divisional Accountant who notes the expenditure on the ledger.

(vii) The documents are then passed to the PQS's office where details are entered in the contracts register before they are returned to the Divisional Accountant for dispatch to the headquarters.

(viii) The payment vouchers will again go thrcugh many other processes in the head office contracts & quantities and accounts departments. A contractor may collect his cheque from the cash office or it could be posted to him.

A 5% retention money is held and may be released after six months after a Certificate of Making Good Defects (Appendix Q) has been issued.

All payment vouchers for all contracts administered by the PWO's office Nairobi are paid through the head office and must go through all these processes irrespective of the size of the payment. We again see that the amount of control here is excessive. The ministry has given the contractor the advantage of this "revolving fund" to assist him complete the job but dilutes it by a lengthy process so that the contractor may have to spend more time and money than necessary chasing interim payments to enable him complete the work within the given time. In the end it is the work that suffers due to delayed executions.

Liquidated and ascertained damages are applied to the contractor as a result of his having failed to complete the works by the set completion date. This is specified in clause 25 of contract conditions (Appendix R). The damages are calculated as being equal to the liquidated damages sum specified in the contract for the period during which the works remain incomplete, that is the time between the contract completion date and date of practical completion. Damages for non-completion can only be applied after due notice in writing has been given to the contractor before the contract completion date has passed. Damages may be deducted from either an interim payment or a final payment.

This clause however is not effectively used by the the ministry to discipline the contractors. Not a single contractor has paid any damages despite their overstaying on site. They have known how to go round this clause by requesting for extension of time and giving reasons that are attributed to the ministry's inefficiency like late payments and extra works. The strength of this clause has therefore been greatly diluted so that it is even meaningless to specify the liquidated damages sum in the contract.

Determination of Contract

The conditions under which the employment of a contractor can be determined are defined in clause 27 of the MOW Contract Agreement. These are broadly default, bankruptcy of a contractor and wrongful assignment. Boom at chapter 8 section 9 states the contractual actions that may be taken in the event of any of the three conditions being breached. In cases where the permanent secretary signs the letter of acceptance, it is he who determines the employment of the contractor. In cases where the PWO signs the letter of acceptance it is he who determines the employment of the contractor without reference to the head office.

The ministry recognizes that determination of a contractor's employment under a contract is a serious step to take and the repurcusions are many. It suggests that ways and means should be sought where possible to complete the works without determination. The following

are cited in BOOM as some of the results of determination:

(i) Delay to the contract.

(ii) Incurrence by the Government of additional costs of completion of remaining works and the contract.

(ii) Downgrading or striking off of the contractor from the ministry's list of approved contractors.

However, this awareness is contradicted by the ministry itself. It was mentioned earlier in this chapter that the ministry will accept the lowest offer even if it is obvious the contract will be frustrated due to a low price so long as the contractor confirms in writing that he will stand by his offer. In the majority of cases the contractors confirm that they stand by their offers and the ministry has virtually given the final decision on which offer should be accepted to the contractors. The abdication of this important decision making has therefore contributed to the chaotic situation in which the works carried out by contract are. The contractors are at times not threatened by the prospects of being struck off the register for they can always register again under a different name and continue experimenting with the ministry.

Maintenance Execution Through Direct Labour

Major Maintenance

When the PWO submits jobs to the maintenance department headquarters for the following years AMWP, he

indicates what projects will be done by contract and which ones will be done by directly employed labour. When time comes for a major maintenance job to be done by directly employed labour, the PMS will be responsible for the surveying of buildings in question and preparing the estimated cost of the materials required for the job. The labour and overhead elements are excluded from the estimates because these are met from different votes. The PMS then prepares an AFF in the normal manner for the PWC's signature and is forwarded to the o^{i}/c M&H through the CQS. A copy of the breakdown of the estimated cost is attached. The CQS then verifies the correctness of the rates and then forwards the documents to the o^{i}/c M&H who will then request the chief accountant to issue the PWO with an AIE. On receipt of the AIE the PWO will instruct the DWO under whose jurisdiction the buildings fall to raise requisitions for materials for the job using the account number on the AIE. Materials purchasing procedures are discussed later in this chapter.

Once the materials are received by the DWO he may commence the works under the direction of a building inspector. Ideally the inspector should be able to allocate the various trades of the job to the artizans so that the job is completed within the specified time. However, no major maintenance jobs have been programmed for direct labour since 1978. The major maintenance jobs recently carried out by direct labour are those "time limited" works of state functions, administration

inspections for the armed forces which call for the shifting of almost an entire depot labour force to beat the deadlines. There is no piece work measurement here, rather the work is done in the spirit of "pulling together" without any time limits and any hours worked beyond 5.00 pm is recorded as overtime for which the artizans will be given time-off.

Most charge-hands who assist the inspectors in supervision know roughly through experience how long it would take a given artizan to carry out a given job. But since there is no incentive scheme or a minimum amount of work that should be done by a given artizan on a given day the tendency is to wait for the 5.00 pm time for breaking off. The supervisors are also handicapped by lack of transport so that it could take them even more than a week before they visit a site to ascertain the progress of a job. They have to rely on the sense of responsibility of the artizans to carry out works without close supervision. Otherwise the inspectors should ensure that there is a steady flow of materials to the site, only it may take them time to verify the correct usage of the materials. The supervisor like in the case of contract works should communicate the progress of the work to the PWO. If there are any works that were not foreseen during the survey the DWO may communicate these to the PWO and extra funds may be applied for in the normal manner from the headquarters or they could be funded from the minor maintenance vote. When the works are satisfactorily

completed the supervisor will issue a certificate of practical completion.

It seems that major maintenance works is a preserve for contractors in Nairobi province. In the last four or five years maintenance has been grossly underfunded to the extent that the directly employed labour (especially painters) have been idle. This labour-on-cost if there is consciousness of efficiency should have prompted the ministry to shift most of the major maintenance works from the inefficient contractors to directly employed labour. This is a reflection of a rather ad hoc maintenance system without a procedure for appraisal and evaluation of costs and resources that would enlighten on their reallocation to achieve efficiency. It is also an indication that there is no appreciation of the advantages and disadvantages that may be attributable to either method of execution.

Minor Maintenance

These are works that cost less than £2000. However, this technical definition of minor works has been derailed by a practice whereby any job that is carried out by contract is seen as a major job regardless of its cost. Whereas jobs costing less than £2000 need not be forwarded to the headquarters for issue of funds, every job that is tendered finds its way to the long head office procedures. This is evidenced by the many jobs costing less than £2000 falling under account 254 for major maintenance.[7] For the purposes of this study, however, minor works refer to day-to-day

maintenance works reported by occupants.

No survey was conducted to determine which is the most prevalent method of reporting defects but the study was able to identify the following:

(i) Personal reports.

(ii) By telephone.

(iii) By letter.

(iv) By sending a neighbour.

(v) By MOWH&PP personnel.

Personal reports involve the occupant himself going to the works depot and discussing the defect with the depot works officer or inspector in charge of the area in question. Most DWOs prefer this method of reporting because the DWO or inspector cross-examines the occupant thereby getting a clearer view of the defect. This enables the inspector to approximate the amount of material required and may save time and other resources that would be utilized in a pre-exectuion inspection. If by telephone unless the occupant specifically asks for the DWO or the inspector concerned, the operators will connect the caller to the reports office where the clerks in-charge will take the scanty details as given by the lay occupant. The supervisor will in such a case have to visit the premises to ascertain the extent of the defect. By letter too unless the occupant is technically endowed may not be precise in the description of the defect. This is further compounded by the fact that letters are in most cases addressed to the PWO who in turn passes the letters over to the PMS. The PMS then

communicates the issue to the DWO and as we have seen the faulty vertical integration in the system it takes too long before action is taken.

Sending a neighbour is very rare but also suffers from the fact that this is a third party that is not very conversant with the defect. He pays more attention to defects affecting him directly. Once in a while too the supervisors or the operatives may notice a defect which they will note down for further action. This depends on how much the supervisor or artizan feels responsible for the state of repair of the buildings and takes the initiative instead of waiting for defects to be reported by the occupants themselves.

Whichever method is used to report a defect, the work to be done will find its way to the Maintenance Reports Office where the report clerks will record the work in a Work Instruction Book with an identifier for the trades e.g.

A for painting works

B for plumbing works

C for carpentry and masonry works

F for electrical and mechanical works

Following the trade identifier will be the serial number beginning with number one (1) for the first job on July one (beginning of financial year) to the last job on the following 30th June (close of financial year). Following the number is the description of the work to be done, building number and location. In Embakasi depot there is even provision in the book for the cost of the

work which is entered after the work is completed and costed.

These details are then transferred to the Work Instruction Sheet (Appendix S) by the clerks who then pass over the sheet to the inspector in charge of the area under which the building falls. The inspector will have to determine whether an artizan can be assigned the job straight away or the description would require that the site be visited to ascertain the extent of the defect. If there are any materials required for the job the inspector will have to fill in a form S 11 also called Counter Requisition and Issue Voucher on which the Work Instruction number will be entered. The artizan to whom the materials are issued signs as the receiving officer. If however, materials are not available an order for the materials will have to be placed as will be described later.

At the back of the work instruction sheet (though not provided for as it is blank) are listed the personal numbers of the operatives that carried out the work, the materials used and time taken. After the work is completed and the occupant and supervisor have signed to that effect, the work instruction is taken to the costing office where it will be attached to the S 11 bearing its number. The S11 has a column for the unit cost of each material. This enables the costing clerks to arrive at the cost of materials used. The cost of labour is based on the operative's monthly pay. What is considered here is the actual hours worked based on an

8 - hour a day work. 15% of the two costs is added to cover for overheads. This is then entered into the Daily Cost Sheet MOW 458 (Appendix T) and eventually transferred to the Building Record Sheet (Appendix U) for each building.

Although the work instruction in use can be used in conjunction with the S 11 to provide some basic management information, its size does not allow for adequate information to be included. It also shows lack of planning because if there was, the works instructions would have to indicate what priorities are assigned what jobs. There is only one sheet of the work instruction so that there is no copy that would be used by a planning and control unit (does not exist in the ministry). This therefore does not allow for checking on progress of work and investigation of what is not yet started. As it is all pending work instructions are dumped in a "pending tray" and not grouped according to priorities. However, it would be wrong to assume that assignment of priorities is completely lacking. All the supervisors agreed that they give first priority to all blocked sewage cases. Others given top priority are main entrance door locks, roof leaks and break down of essential service facilities. But there is no systematic documentation of these priorities, rather it is the supervisor of the moment that decides on what is urgent or not. Without documented priorities, delay time which is important for planning day-to-day maintenance works is also lacking.

Also missing from the work instruction sheets is Estimted Labour Hours and Actual Labour Hours which is useful for both cost control and bonusing.[8] In the circumstances it is not possible to determine the hours productively worked, determine the reasons for the non-productive time and by periodical evaluation attempt to improve on productive time. The major reasons given by DWOs for outstanding work is lack of materials and transport. Transport if available is very expensive and these should be reflected during such evaluation thereby underlying the need for priority setting and eventually grouping of works to reduce on travelling time and expenses.

Stock Control

All purchases of building maintenance materials are done centrally for all depots by the Divisional Supplies Officer (DSO) stationed at the provincial headquarters. The sources of supplies are:

(i) Common user or classified items stocked by the government's Supplies Branch.

(ii) Term contracts arranged nationally by the Supplies Branch.

(iii) Government Press for printed stationery.

(iv) Ministry's central stores for items which are centrally procurred or imported.

(v) Purchases from suppliers in respect of items which are not covered under the above categories.

The steps to be followed and the time taken to receive materials at the depot depends on the source and value of the supplies. The whole process begins when the DWO instructs the storeman or the storeman on his own initiative places an order for materials required. The storeman will fill S 12 forms which will be signed by the DWO as the requisitioning officer. The forms will then be forwarded to the PMS for approval. After approval they are taken to the DSO.

With effect from 1st July, 1983 the following options are open to the DSO to proceed after receiving an S 12 form.[9]

(i) If stores or services not exceeding Kshs. 1000/- then purchasing can be done without quotations or agreements.

(ii) If stores or services not exceeding Kshs. 500/- then purchasing can be done by cash imprest.

(iii) If stores or services cost more than Shs. 1000/- but less than Kshs, 4000/- then purchasing must be done without reference to a tender board.

(iv) Stores or services upto a limit of a total charge of Kshs. 4000/- may not need competitive quotations provided the purchasing is done from the manufacturer of the item(s) or the manufacturer's principal agent.

(v) Quotations of between Kshs. 4000/- and 20,000/- will be adjudicated by the Ministerial Tender Board which meets once a month.

(vi) Stores and services more than Kshs. 20,000/- per single item in one financial year will go to open tender.

(vii) Tenders of upto Kshs. 60,000/- will be adjudicated by the Ministerial Tender Board while for more than Kshs. 60,000/- will be adjudicated by the Central Tender Board on recommendations by the Ministerial Tender Board.

For items like paints, timber, cement, fire fighting equipment, cookers etc there are term contracts that have been nationally arranged by the Supplies Branch. For such items the DSO will quote on the S 12 form the contract number, price and name of supplier. It will then be passed to accounts department where the liability will be noted and a Local Purchase Order (LPO) prepared in favour of the supplier. Items like drain cleaning sets, locks, latches, nails, roofing materials are classified and when the DSO receives an S 12 form containing such items he forwards them to the Supplies Branch who will either supply the materials or if they don't have the materials they may grant the PWO authority to purchase the materials from local suppliers and the procedures revert to (i) to (vii) above.

Generally getting materials from this source has been very difficult because of the long procedures. Even getting the authority to purchase the materials locally may take quite a long time to come.

The storeman from the depots have to keep checking with the accounts section on LPOs that have already been signed by the PWO. The storeman will collect LPOs from accounts department and will either ring the suppliers to come and collect the LPOs or they may deliver the LPOs to the suppliers. The supplier will then either deliver the materials to the depot - or the materials may be collected by the storeman from the suppliers. When the materials are received the storeman enters the receipts on a Counter Receipt Voucher (S 13). The original receipt voucher is attached to the supplier's delivery note for filing and the duplicate is attached to the supplier's invoice for onward transmission to the accounts department for payment. The receipts are also entered in a bin card (S 3). Each type of material has got its own card with receipts showing the relevant S 13 number in red and issues showing the relevant S 11 number in blue or black and the quantity issued subtracted from the quantity in stock. In the S 11 is shown the work instruction number thus enabling the costing clerks to correspond the two for costing.

Although the in-store procedures seem to be adequate for auditing the use of the materials, the purchasing procedures are rather long and discouraging. The references to the tender boards tend to consume much

valuable time. The Divisional stores office unlike the Contracts and Quantity Surveying office does not keep a register of approved suppliers. They depend on a few established suppliers from whom they purchase from time to time but quite often too they place LPOs with "trialists" who do not even have offices or proper contact. This group of suppliers act as unofficial middlemen between the hardware stores and the ministry. They in most cases do not honour the orders thereby causing the ministry to commit funds. The ministry due to its poor management practices do not take steps to cancel these orders in time culminating into some money being surrendered to the Treasury at the end of the financial year. Lack of materials was found to be the major complaint of the DWOs and it is an issue that continues to be the centre of discussion during departmental heads meetings.

In summarizing, it was found that in the execution phase the procedures are too long due to the overcentralization of authority in the ministry headquarters. Down in the province there are no short-term programmes for planning the execution so that it is generally an ad hoc system. Even works on the AMWP are not programmed to fall at any particular period during the year. The reasons for choosing either outside contractors or directly employed labour are not evidenced nor is there any that the performance of the two are ever compared or assessed individually by the ministry. Execution of day-to-day maintenance is also

inefficient due to poor inventory control so that there is constant shortage of building maintenance materials. There is also heavy reliance on transport which the ministry has not adequately provided nor maintained the existing ones. A depot like Kahawa has to transport about 100 workers every morning and evening to and from work over a distance of 16 kilometres one way. It is definitely a costly exercise and with only one pick-up of a 16 - passenger capacity the chaos existing there are very clear. This results into alot of non-productive time. But even in the other depots which do not have the problem of transporting the workers to and from work, it is not unusual to find the first contingent of workers setting out at 9.00 am instead of 8.00 am. This is largely due to the supervisors not planning work in advance. The haphazard allocation of work done in the morning does not therefore give enough scope for efficient distribution of jobs to the artizans.
A result of this is that an artizan may do only a two hour job in the morning section and if there is no transport back to the office for reallocation he calls it a day.

FOOTNOTES

1. Douglas B.O. Aloo, "The Role of the small scale contractor in MOWH&PP" (Term Paper, University of Nairobi, 1984).

2. Reginald Lee, Building Maintenance Management (London, Ganada Publishing, 1981), pp. 233-234.

3. Republic of Kenya, Ministry of Works, Housing and Physical Planning, Building Organization and Operations Manual, (Nairobi, 1970), Chapter 6 section 40.

4. Chief Architect to Permanent Secretary, 16th M March 1982, Ministry of Works, Housing and Physical Planning, B.K1/3/97.

5. Reginald Lee, Building Maintenance Management, pp. 306-307

6. E. Bampton, "Improving Productivity in the Execution of Maintenance Works," Maintenance Information Service, The Chartered Institute of Building , no. 12 (1980).

7. Republic of Kenya, Ministry of Works,,Housing and Physical Planning, Contract Records Books, (1978-1984).

8. Reginald Lee, Building Maintenance Management, pp. 244-245.

9. Republic of Kenya, Office of the President, District Focus for Rural Development, (Nairobi, 1983)

CHAPTER FIVE

ANALYSIS AND EVALUATION OF EFFECTIVENESS AND EFFICIENCY IN THE EXECUTION OF MAINTENANCE WORKS

Introduction

In attempting to determine if the maintenance management practices of MOWH&PP are effective and efficient, this study has set out in chapter two what the ideal structure and practices suitable for the ministry should be. Chapters three and four have discussed the structure and practices of the ministry as they are, pointing out where they deviate from the model. In this chapter the study presents the results achieved by the ministry and in tabulating these results their relation to the deviations are highlighted.

Physical Condition of Premises

In discussing effectiveness this study has mentioned that an organization is seen to be effective when it assumes a viable relationship with its environment.[1] A viable relationship can be assumed by a maintenance organization when it maintains its buildings to currently acceptable standards. The utility and value of the buildings must be upheld so that they continue to serve the purposes for which they were built. If this is not achieved the persons using these buildings will not be happy and so there will be no viable relationship between the maintenance

organization and its environment.

A survey was therefore conducted to establish if the physical condition of government buildings are within the acceptable standards. This is depicted in table 5.1. A wall was considered to be defective if it was dirty, cracked and/or plaster peeled off. Roofs are defective when there is leakage, while floors are classified same if cracked, pot-holed, tiles or woodblock floors have come off or scratched. Doors are defective when it is off its hinges, broken or missing locks, while windows are classified so if it is off its hinges, broken, missing stays or fasteners and broken panes. Fittings refer to WC pans, cisterns, wash hand basins, sinks, piping and electrical works.

The buildings are of different ages and use (residential, hospitals and offices). In case of residential buildings the lower grade, middle grade and higher grade categories are all represented in the sample. In the lower category estates of Jogoo Road and Shauri Moyo the major problems were dirty walls generally due to the use of charcoal burners for cooking and staining due to water pipe leaks (Plate 1, 2 and 3). The floors are cement screed and are either pot-holed, cracked or worn-out. Some residents of Jogoo Road phase one have had to do with hacked floors for about six years. The floors were hacked by a contractor who was supposed to repair them in 1979 but deserted site when he realized he was going at a loss. A second contractor was engaged in 1983 but was also unable to carry out the

work. The floors were finally repaired in 1984 during the time of this survey. The inconvenience of the hacked floors was caused by the ministry's reliance on the contractors to withdraw or to confirm to stand by their tender figures even when they are too low. It is also clear that the time lag between the first-default and engagement of the second contractor is too long. This is due to lack of proper grip by the maintenance managers on planning and control principles together with lack of appreciation on priorities. Hacked floors are dusty and uneven and so dangerous to health and arrangements for retendering should have followed immediately. The fittings, especially toilets (plate 4) and water pipes were the other major defects in these estates.

Milimani and Upper Hill flats belong to the middle category and have less defects. The major defects here are defective doors which have been forced open due to misplaced keys, cookers, leaking kitchen sinks and wash hand basin traps and defective toilet cisterns. Floor tiles especially in the Milimani Flats have peeled off due to flooding in some flats as a result of rainwater finding its way into the rooms from the balconies. Kileleshwa pool housing is on poorer physical condition than the Hill area pool housing. Some of the Kileleshwa houses are of mud bricks (not burnt) and covered with corrugated iron sheets (plate 5). It can be said that their condition is not due to neglect but due to old age having been constructed in the 1950s. The Hill area houses are of masonry construction with mangalore tile

Estate (Building)	Units Inspected	Defective units as percentage of those inspected					
		Walls	Roofs	Floors	Doors	Windows	Fittings (services)
Jogco Road Phase 1	30	85%	30%	90%	60%	25%	80%
Shauri Moyo	30	70%	40%	80%	40%	30%	95%
Milimani flats	22	20%	5%	30%	50%	10%	30%
Jogco House	1 (Ten floors)	Nil	Nil	30%	10%	Nil	80%
Kileleshwa Pool Housing	20	60%	50%	60%	60%	30%	40%
Upper Hill Flats	20	20%	30%	30%	40%	20%	30%
Mathare Mental Hospital	10	50%	60%	30%	40%	40%	60%
Hill Area Pool Housing	10	20%	10%	20%	20%	Nil	10%

Table 5.1: Physical Condition of Government Buildings.

roofs. One other factor going for their relatively sound state is the fact that they are occupied by very senior government officers who in most cases use the top MOWH&PP management to order for the rectification of any defects without much delay. Whereas the mangalore tiles have served the hill area residents well, the Kileleshwa houses have some flat portions covered with roofing felt which have proved a a constant menace to the occupants and maintainers. The major problem in Jogoo House has been the toilets over 40% of which have been closed for about three years now. Toilets too have been a big problem at Mathare Mental Hospital. This however, has improved with the establishment of a sub-depot in the hospital in 1982 only to be overtaken by roof leaks especially in the wards forcing the patients to shift everytime it rains.

Other than physical surveys, a study of the correspondence files showed gross neglect of premises. Worth mentioning are cases of roof leaks which were numerous e.g. Materials Branch, Muthangari Police Station, Kenya Institute of Mass Communication, Police Headquarters, and Kamiti Prison. These roof leaks have been in existence for more than two years and with cost growth in mind the period is too long. For example, it was learnt that the leakage at Kamiti Prison was reported to Nairobi Province in 1981, and a survey was carried out immediately to determine the extent of the remedial work necessary. Tenders were called the same

year and it was not until 1984 that the work commenced. It is also apparent that the ministry made the same mistake of awarding the contract to the lowest tenderer to take site with the 1981 rates in 1984. Already the contract is well past its completion period indicating that all is not well with its execution.

User Reaction

Table 5.2 shows that 93% of those interviewed agreed that the workmanship of the ministry's direct labour is good. However, 60% of them lamented that response to maintenance requests is very poor. About 34% thought the response is poor. The percentage could have been more authoritative if during the interviews there was a priority list prepared by the ministry saying for example that sewer blockages will be attended to within 24 hours, broken window panes within 7 days, internal doors within two weeks etc. As it is, even the not so urgent items like painting would cause dissatisfaction if not attended to "as soon as possible" which to some users could mean even one week. But this sort of misunderstanding emanates from the ministry which apparently is not being sincere to the users by informing them of the priority placings and so when to expect action. The absence of a documented priorities list therefore reflects the non-existence of a system for planning the execution of maintenance works. With the increasing government building stock and the aging of the existing stock, the situation has to get out of hand.

ESTATE	JOGOO ROAD PHASE 1	SHAURI MOYO	MILIMANI FLATS	JOGOO HOUSE	KILELESHWA POOL HOUSING	UPPER HILL FLATS	MATHARE MENTAL HOSP.	HILL AREA POOL HOUSING	TOTAL
NUMBER INTERVIEWED	30	30	22	1	20	20	5	10	138
A. WORKMANSHIP									
1 VERY POOR	NIL	NIL	NIL	NIL	5%	NIL	NIL	NIL	0.6%
2 POOR	10%	5%	NIL	NIL	5%	5%	NIL	5%	3.8%
3 GOOD	85%	90%	100%	100%	90%	95%	100%	85%	93.1%
4 VERY GOOD	5%	5%	NIL	NIL	NIL	NIL	NIL	10%	2.5%
B. RESPONSE TO MAINTENANCE REQUESTS									
1 VERY POOR	85%	85%	70%	NIL	80%	50%	60%	50%	60%

ESTATE	JOGOO ROAD PHASE 1	SHAURI MOYO	MILIMANI FLATS	JOGOO HOUSE	KILELESHWA POOL HOUSING	UPPER HILL FLATS	MATHARE MENTAL HOSP.	HILL AREA POOL HOUSING	TOTAL
NUMBER INTERVIEWED	30	30	22	1	20	20	5	10	138
A. WORKMANSHIP									
1 VERY POOR	NIL	NIL	NIL	NIL	5%	NIL	NIL	NIL	0.6%
2 POOR	10%	5%	NIL	NIL	5%	5%	NIL	5%	3.8%
3 GOOD	85%	90%	100%	100%	90%	95%	100%	85%	93.1%
4 VERY GOOD	5%	5%	NIL	NIL	NIL	NIL	NIL	10%	2.5%
B. RESPONSE TO MAINTENANCE REQUESTS									
1 VERY POOR	85%	85%	70%	NIL	80%	50%	60%	50%	60%
2 POOR	10%	10%	30%	100%	15%	40%	40%	30%	34.4%
3 GOOD	5%	5%	NIL	NIL	5%	5%	NIL	15%	4.4%
4 VERY GOOD	NIL	NIL	NIL	NIL	NIL	5%	NIL	5%	1.2%
C. DEFECTS NOT REPORTED	30%	20%	20%	100%	15%	40%	20%	20%	33.1%
D. INSPECTIONS WITHOUT REQUESTS	10%	20%	10%	100%	10%	30%	10%	10%	25%

Table 5.2: Rating of Workmanship, Response to Maintenance Requests, Reporting of Defects and Planned Inspections

It is therefore suggested that the ministry should embark on drawing a priority list instead of the supervisors using their intuition to give priorities as they wish. But the absence of the priority list does not altogether cancel the authority of the percentages. The physical condition of the buildings inspected for this study revealed defects that could have been attended to within one week lasting more than three years. The interviews further revealed that 33% of the defects had not been reported to the ministry. Total reliance on occupants to report defects does not conform to good maintenance management practices because their attitudes towards repairs vary.[2] Some will report trivials while others will not report even dangerous defects. If the 33% were to continue maintaining such an attitude of not reporting defects and no regular inspections are there, then the rate at which some of the buildings are deteroriating must be very high. Some of the occupants said they have not reported because they know no action would be taken while some claim to be too far from the depots.

In trying to find out if there are any chances of rescuing the 33% by way of the maintenance staff identifying these defects themselves, the interviews disclosed that only a mere 25% of the occupants have witnessed the maintenance staff carry out inspections without the defects being reported. Although the Code of Regulations provides that a government building be inspected at least twice a year[3], the interviewees were

responding to whether any inspections initiated by the ministry have been carried out in the premises within the last five years. Five years is the long-term plan period for the ministry. The low 25% is an indicator to the existence of some elements of planned corrective maintenance. However, with a five-year plan period it should have been expected that between 80% and 100% of the total building stock were inspected during the period.

Backlog in Minor Maintenance

The survey revealed poor physical condition of government buildings. The dissatisfaction of the occupants has gone further to enlighten this study that MOWH&PP does not assume a viable relationship with its environment and as such is not effective in its performance of building maintenance tasks. A further step was therefore to examine the Works Instructions Register to corroborate the occupants dissatisfaction and also determine service efficiency within the ministry. The results of this examination are potrayed in table 5.3. Embakasi and Park Road depots were established in 1980/81 and the boundaries of the others realigned to coincide with the government administrative divisions in Nairobi. From the table it is clear that the performance of the ministry has greatly declined. Machakos Road for example has declined from a backlog of 14% in 1976/77 to 41% in 1983/84. Kileleshwa whose Work Instruction books were carelessly kept and as such some of them could not be

	1976			1977/78			1978/79			1979/80			1980/81			1981/82			1982/83			1983/84		
DEPOT	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
EMBAKASI	-	-	-	-	-	-	-	-	-	-	-	-	49	18	63%	904	586	35%	1128	480	57%	2184	1174	46%
MACHAKOS ROAD	16848	14432	14%	17136	14706	14%	16904	13746	19%	17412	13230	24%	11908	7456	37%	9160	6316	31%	7360	4904	33%	9008	5288	41%
KILELESHWA	6184	5684	8%	6724	6164	8%	8784	8072	8%	7988	5849	27%	5214	3538	32%	4263	2853	33%	4584	3690	20%	2900	1552	47%
KAHAWA	-	-	-	-	-	-	5433	3838	29%	6144	4301	30%	6500	3668	44%	6616	2460	63%	2500	364	85%	2865	942	67%
PARK ROAD	-	-	-	-	-	-	-	-	-	-	-	-	11560	10784	7%	6540	4212	36%	6024	3350	44%	7058	4358	38%
TOTALS	23032	20116	13%	23860	20870	13%	31121	25656	18%	31544	23380	26%	35182	25464	28%	27483	16427	40%	21596	12788	41%	24015	13320	45%

Table 5.3 Day-to-Day Maintenance Works Backlog, MOWH&PP, Nairobi, Province

* represents the years 1968/69. 1972/73 and 1973/74 progressively

Columns 1 - Jobs Reported

2.- Jobs completed

3 - Backlog

traced had a commendable performance in the years 1968/69, 1972/73 and 1973/74 but has declined so much so that nearly half the jobs reported are not carried out. Kahawa has the worst record with 1982/83 showing 85% of the defects reported not being made good. Park Road, except for the year 1980/81 has also exhibited poor performance with Embakasi being even worse.

As the study mentioned in chapter two, these percentages do not have an interpretive meaning as far as effectiveness or efficiency is concerned. Rather, it is the trend that should be given attention so that it may be seen whether the performance is improving or declining. As it is, the performance is generally on the decline. The three aspects namely the physical condition of the buildings, the user dissatisfaction and the declining performance in executing the minor day-to-day maintenance requests therefore show that MOWH&PP maintenance department is not satisfactorily effective. Foremost in the ministry's defence to the poor performance is lack of adequate funds.

Lack of Adequate Funds

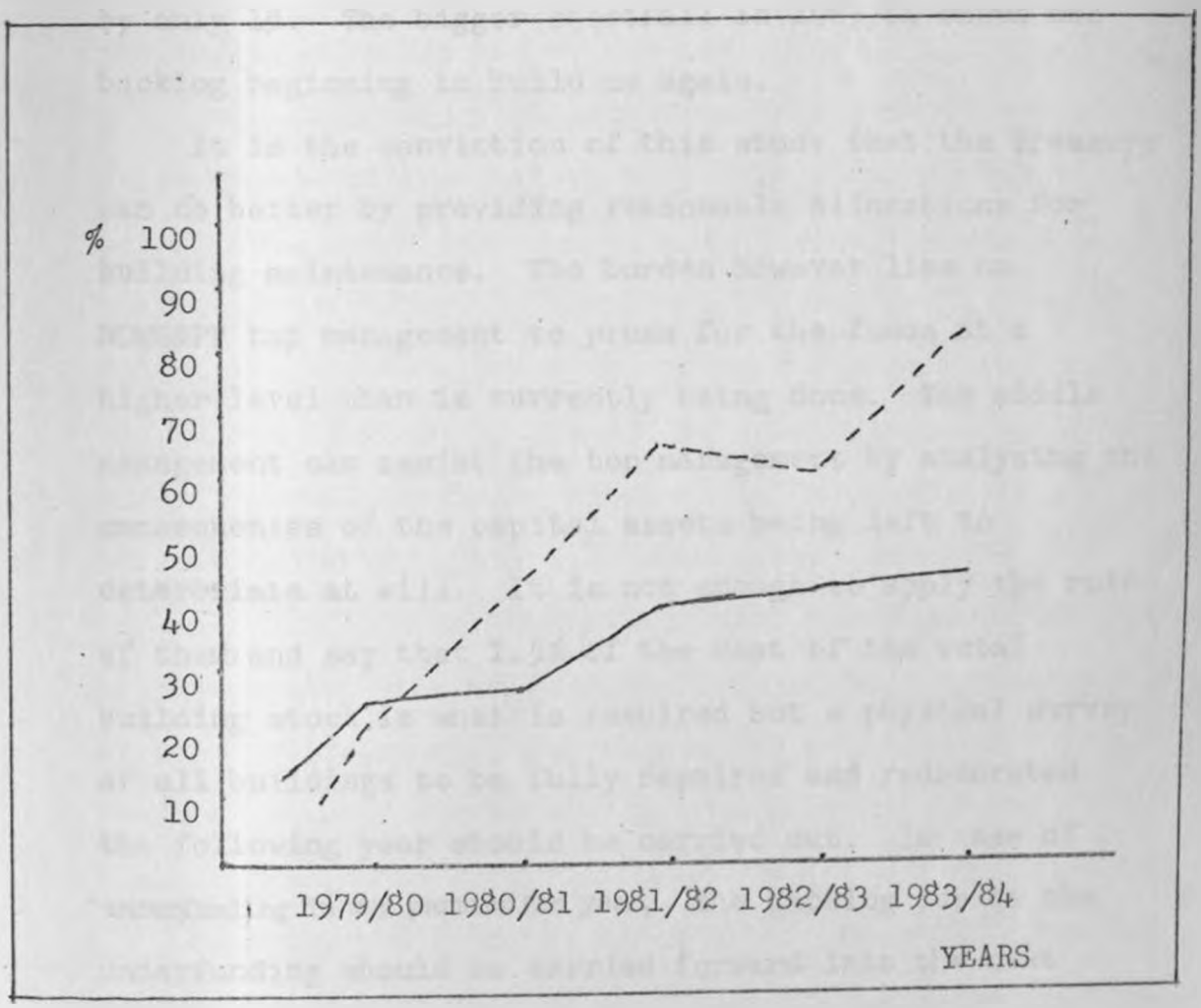
An examination of the Building Register print-outs and the Recurrent Expenditure estimates for various years produced results potrayed in table 5.4. The government policy on building maintenance is that no more than 1.5% of a building's replacement cost plus 10% of the 1.5% to cover for sites and grounds should be spent on its maintenance. It is this formula that

YEAR	FUNDS REQUIRED	FUNDS APPROVED	% SHORTFALL
1976/77	2,724,902	2,496,010	8.4%
1977/78	3,187,227	2,894,002	9.2%
1978/79	4,368,401	3,867,314	11.5%
1979/80	5,699,835	4,494,700	21.1%
1980/81	6,699,124	3,682,000	45%
1981/82	7,158,873	2,400,412	66.5%
1982/83	3,155,053	3,106,000	62.0%
1983/84	9,735,789	1,846,000	81.0%

Table 5.4: Funds Required and Funds Approved for Building Maintenance Works, MOWH&PP for the Whole Republic.

is applied on the total building values to give the "funds required" column. Funds approved is what was approved by the Treasury for the ministry's use in execution of building maintenance works. At a glance, it is seen that maintenance continues to be underfunded. Maintenance studies often speak of the upper management adding an arbitrary percentage to the previous year's budget. However, here is seen a fall in 1980/81 from the 1979/80 allocation in constant terms from K£4,494,700 to K£3,682,000 and it continues to slide so that the 1983/84 allocation is even less than the 1976/77 allocation in constant terms.

Finances like any other resources are rarely adequate hence the need for sound management to make efficient use of the scarce. But should the short-fall come upto 80% of the funds required? It is understandable that there is inflation the world over and hence the scarcity of funds. But the degree of underfunding is so enormous that it potrays lack of appreciation of the central role of the built environment to our activities and the capital debt tied on the built environment. Figure 5.1 attempts to show the relationship between the shortfall in funding maintenance works and the backlog in minor maintenance works. The backlog may be due to many quantifiable as well as non-quantifiable factors but there is definitely a relationship between the shortfall and the backlog. Taking 1979/80 as a base year, there is a backlog of 26%. The shortfall in funding shoots up by almost 25% the following year but



------% shortfall in funding

_____% backlog in minor maintenance

Figure 5.1 Comparison between shortfall in funding and backlog in minor maintenance

the backlog builds up by only 2%. A further shortfall of about 22% in 1981/82 now corresponds to an increased backlog of about 12%. The funding situation is a little improved in 1982/83 and this time the backlog builds up by only 1%. The bigger shortfall in 1983/84 shows the backlog beginning to build up again.

It is the conviction of this study that the Treasury can do better by providing reasonable allocations for building maintenance. The burden however lies on MOWH&PP top management to press for the funds at a higher level than is currently being done. The middle management can assist the top management by analysing the consequences of the capital assets being left to deteroriate at will. It is not enough to apply the rule of thumb and say that 1.5% of the cost of the total building stock is what is required but a physical survey of all buildings to be fully repaired and redecorated the following year should be carried out. In case of underfunding in any particular year, the backlog due to the underfunding should be carried forward into the next year's budget. In this way the ministry will be able to identify its outstanding workload at any given time. The current practice in Nairobi Province is that a number of buildings will be listed for an annual maintenance works programme without any systematic drawing from a long-term programme. Generally the budget falls short of the actual budget because of anticipation of cuts from the Treasury. The budget is

generally not substantiated because it does not contain the breakdown of the actual works to be done. The practice should revert to pre-1979/80 when all the buildings to be repaired and redecorated used to be physically surveyed and every item costed.

It can therefore be concluded that lack of adequate funds is one of the factors that is causing MOWH&PP maintenance department not to have a viable relationship with its environment. This study however feels that the ministry's top management can press for a more reasonable allocation of funds by presenting substantiated estimates and not mere application of the rule of thumb. It is not obvious that laymen will immediately grasp the implications of a deteroriating built environment and it is upto the experts in MOWH&PP to present an analysis of such implications. Before such an analysis is brought to their understanding it may be unfair to blame them for the underfunding.

However, the adequacy of funds or any other resources is not the crux of this study. The crux of this study is to determine how efficiently the scarce resources available are utilized to achieve maximum economy. Already demonstrated is an increasing backlog with an increasing shortfall in the finances availed to the maintenance department. It is therefore opportune to display the expenditure returns. Tables 5.5 and 5.6 show that despite the shortfall in funds required for building maintenance, Nairobi Province had unspent balances in 1981/82 and 1982/83 of 17% and 32% of the

K£	TOTAL ALLOCATION	EXPENDITURE	BALANCE	BALANCE AS % OF ALLOCATION
Essential services	220,693	197,802	22,891	10
Electricity, Water and Conservancy	184,280	159,118	25,162	14
Sites and Grounds	8,352	5,357	2,095	25
State Functions	2,634	1,700	934	36
MOWH&PP Furniture	320	92	228	71
Minor maintenance (Electrical)	140,350	113,841	26,509	19
Minor maintenance (Buildings)	215,626	166,488	49,138	23
Major maintenance	146,442	117,150	29,292	20
TOTAL	918,697	761,548	156,249	17

Table 5.5: 1981/82 Consolidated Expenditure Returns, MOWH&PP, Nairobi Province

K£	TOTAL ALLOCATION	EXPENDITURE	BALANCE	BALANCE AS % OF ALLOCATION
Essential services	150,000	125,455	24,545	16
Electricity, Water and Conservancy	75,000	71,010	3,783	5
Sites and Grounds	16,911	12,845	1,361	8
Public Holidays	9,500	5,042	2,783	29
MOWH&PP Furniture	240	15	225	94
Minor maintenance (Electrical)	87,000	66,568	20,522	24
Minor maintenance (Buildings)	199,080	128,602	20,831	11
Major maintenance	302,747	144,489	158,258	52
TOTAL	650,478	428,566	207,763	32

Table 5.6: 1982/83 Consolidated Expenditure Returns MOWH&PP, Nairobi Province

total allocations respectively. The earlier year 1980/81 at table 5.7 potrays a case of over expenditure in almost all accounts except for maintenance of MOWH&PP temporary buildings, public holidays and major maintenance for both electrical and buildings. 1978/79 potray even a more gloomy picture with the total unspent balance representing 42% of the total allocation, the biggest culprit being minor maintenance with 49%.

So whereas it is acceptable that inadequate funds may have contributed to MOWH&PP's poor performance the financial returns show that there is inefficiency in the management of the inadequate funds available. The reasons that are prominent in the Work Allocation Analysis Sheets as the cause of outstanding works are:

(i) Lack of materials.

(ii) Lack of transport.

Lack of materials indicate lack of funds for purchasing materials required for maintenance. However, the accounts for minor maintenance show in tables 5.5 and 5.6 unspent balances as high as 23% of the allocations. Lack of transport also indicates lack of funds to purchase vehicles or repair and fuel the existing ones. On the average each depot has about four pick ups and at least one lorry. However most of the vehicles have been grounded due to minor defects so that each depot now has an average of one pick-up only on the road (plate 6). This definitely makes movement to sites very difficult and as such many defects will remain unattended to. But the question is whether it is beyond the capability of the ministry to repair the serviceable but grounded vehicles

K£	TOTAL ALLOCATION	EXPENDITURE	BALANCE	BALANCE AS % OF ALLOCATION
Minor maintenance	1,130,008	576,528	553,480	49
Major maintenance	824,257	506,077	318,180	39
TOTAL	2,139,543	1,235,563	903,980	42

Table 5.7a: 1978/79 Consolidated Expenditure Returns,

MOWH&PP, Nairobi Province.

K£	TOTAL ALLOCATION	EXPENDITURE	BALANCE	BALANCE AS % OF ALLOCATION
Electricity, Water and Conservancy	108,000	144,859	36,859	
Sites and Grounds	22,000	46,467	24,467	
MCW Temporary Buildings	308	15	293	
Minor Maintenance (Buildings)	217,645	263,977	46,332	
Major Maintenance (Buildings)	451,707	404,356	47,351	11
Public Holidays	13,000	6,113	6,887	
State Functions	3,940	33,255	29,315	
MCW Furniture	801	276	525	
Essential Services	147,750	162,134	14,384	
Minor Maintenance (Electrical)	160,000	189,070	29,070	
Major maintenance (Electrical)	118,361	60,965	57,396	49
TOTAL			117.815	

Table 5.7 b: 1980/81 Consolidated Expenditure Returns

and whether it is possible for the ministry to reorganize itself and rely less on transport if the costs of repairs and fuel are beyond their ability.

Management Deficiencies

The poor physical condition of buildings depicted in table 5.1, the dissatisfaction of the users shown in table 5.2, the growing backlog in table 5.3 are indicators that all is not well in the organization and execution of building maintenance works in MOWH&PP. Table 5.5, 5.6 and 5.7 indicate that there are deficiencies in the management system of the maintenance department. A maintenance department of the ministry's magnitude must of necessity have a balance between planned and unplanned maintenance. It must then programme its work and plan its execution bearing in mind the priorities that should be accorded various kinds of work. Failure to incorporate these elements in a maintenance organization of this size will lead to the results already seen earlier in this chapter. It reflects an ad hoc system whereby all operations are carried out blindly without any attempts to relate the past to the future.

Standards

As mentioned in chapter two an organization that is conscious of effectiveness and efficiency is goal oriented and the standards expressed are what the maintenance organization aims at. There was no evidence of consciously set standards by the ministry except in the mechanical section where there is "frequency based

maintenance system". It is the established standards that would guide the ministry in formulating a planned maintenance system which would in turn result in greater and more effective use of resources. A planned maintenance system requires first and foremost a general appraisal of the whole situation, surveying the task in hand and the resources available. The general appraisal and survey should be able to give the management what should be done in a given period and these are then weighed against the resources available. If the resources are not adequate for the tasks the management will then assign priorities accordingly.

It is this aspect of maintenance management that is seen to be lacking in that if it could have been appreciated by the MOWH&PP maintenance department then it should not have spent large sums of money painting Old Jogoo House (Kshs. 1.2 million in 1982/83 when it was last painted in 1979/80), Parliament Buildings (Kshs. 800,000/- in the same period when it was last painted in 1978/79 and that a lot of painting is done from time to time especially before new sessions begin) and various police stations and buildings (over one million shillings) when roof leaks were persistent at Kamiti Prison causing damage to prisoners' personal belongings, threatening the ammunition depot which should be water tight and the Kenya Institute of Mass Communication which houses very expensive filming equipment. What is clear is that all these leakages existed before the decision to go on these elaborate

painting sprees were made and that these funds could have satisfactorily covered the remedial work to the roofs. Setting standards and thereby identifying the workload and weighing it against the resources available should have helped Nairobi province make a decision between painting and making good the leaking roofs.

Setting of standards also provides a basis for planning and controlling maintenance operations. In the case of backlogs shown in table 5.3 they could say set a maximum backlog of 8% achieved by Kileleshwa in 1968/69 as what every depot should aim at. At the end of every year the work instruction registers should be analysed to see if this is achieved or not. If it is not achieved then the management system should be examined to find out the cause of failure and corrective action taken. If it is achieved more effort should be put to do even better. But the financial situation being what it is they can always hide behind "trying our best". In such circumstances therefore MOWH&PP Nairobi province should have had as their standards the total funds allocated. The aim here should be to programme the execution and payment of all contract work and purchases within the accounting period. Not much attention is paid to this such that suppliers of materials hold onto LPOs for as long as they wish. The contractors also stay on site for too long without being penalized as provided for in the contract agreement because the management does not bother to follow up their progress so that work may be executed according to a laid down programme.

The absence of this follow-up and adhering to the contract agreements has led to the inefficiency potrayed in tables 5.5 to 5.7.

Programming of Maintenance Work

The significance and purposes of programming maintenance work have been highlighted in chapter two. One of the purposes of long-term programmes is to determine the general level of expenditure on maintenance to achieve the desired standards.[4] No long term programmes have ever been prepared by Nairobi Province so that they do not know the desired levels of expenditure. Not that this is directly related to the poor conditions of the buildings as already shown or to the backlog but that the existence of such a programme would potray the organization as purposeful and forward looking. Long term programmes also amongst others helps to determine the structure and staffing of the maintenance organization and whether it would be advantageous to employ operatives directly to carry out part or the whole of the work.[5] The depots recently submitted their manpower requirements to the Provincial Works Officer. What none of the Depot Works Officers could answer was how they arrived at the figures they requested. Without long term programmes, it is not easy to determine the task at hand and therefore the resources required. It is possible lack of adequate manpower (it does not appear in the Work Allocation Analysis Sheets as one of the causes of outstanding works) could be a cause to the backlogs but there should be a

scientific or logical method of arriving at the manpower required.

The annual programmes prepared by Nairobi province are just a formality and do not reap the benefits associated with the preparation of such programmes. First of all there is no long term programme from which to draw the annual programmes. Secondly there are no annual inspections to identify work necessary to be carried out in the next year. This explains why about 75% of the occupants interviewed have not seen the maintainers inspect their premises without a maintenance request having been put to them. The annual programme is usually prepared hurriedly towards the end of the outgoing year. Totally absent from the maintenance department of MOWH&PP are short-term programmes. The absence of long-term, short term programmes and the shoddy preparation of annual programmes therefore indicate lack of effective planning and control of the execution of maintenance works.

Jobs are not programmed to fall at pre-set dates, so that preparation of contract documents and tendering are not planned. Failure to allocate the total workload to the months of the year for close monitoring is responsible for the time overrun potrayed in table 5.8. The table shows the number of jobs contracted in the various years, those completed in time and those that have gone beyond the scheduled time showing the time overrun as a percentage of the scheduled time. The best performance was in 1977/78 when about 30% of the jobs

YEAR	NUMBER OF JOBS	TIME OVERUN - % OF ORINICAL CONTRACT PERIOD							
		0	1 TO 200	201 TO 400	401 TO 600	601 TO 800	801 TO 1000	1001 TO 1200	OVER 1200
1976/77	96	21 22%	41 44%	12 13%	9 9%	9 9%	- -	4 4%	- -
1977/78	86	26 30%	38 44%	16 19%	3 4%	-	-	-	3 4%
1978/79	83	24 29%	31 38%	11 13%	7 8%	3 4%	- -	7 8%	- -
1979/80	89	3 3%	43 48%	34 38%	- -	9 10%	- -	- -	- -
1980/81	69	8 12%	22 32%	9 13%	14 20%	4 6%	2 3%	5 7%	5 7%
1981/82	75	21 28%	18 24%	11 15%	13 17%	6 8%	1 1%	- -	5 7%
1982/83	48	11 23%	25 52%	8 17%	- -	1 2%	1 2%	- -	2 4%

Table 5.8: Time overrun for Building Maintenance Contracts MOWH&PP, Nairobi Province.

were completed in time with the worst being in 1979/80 when only 3% were completed in time. The fact that these jobs were scheduled to end at particular times is a formality in that contracts must be timed. It is purposeless in the light of the management team at MOWH&PP Nairobi province because not enough effort is made to ensure that the job is completed according to plan. A check on project files for various jobs in the province indicate there are site weekly reports on all jobs. Common in the reports is the number of contracts that have overrun their scheduled times but without action by way of warning the contractor or terminating the contract. So here is seen a case of "forced" planning which is made ineffective because of failure to exercise the necessary control. Not that the schedules may be accurate, but that if sufficient control was effected the management would know if it has been scheduling reasonably or unreasonably. That is, control must be applied continuously to up-date the plans and to enable reconsideration of work ahead in the light of what has already taken place.

Referring again to tables 5.5 to 5.7 we see that the unspent balances for major maintenance hits a high 53% in 1983/84. Apart from lack of control during the execution phase, the management team does not seem to be aware of the fact that by June 30th all funds not spent are surrendered to the Treasury. This apparent unawareness is potrayed by the number of contracts that are left to span two financial years.

YEAR	TOTAL NUMBER OF JOBS	JOBS OVERLAPPING FINANCIAL YEAR	JOBS NOT FINALIZED TO DATE
1976/77	96	25 26%	-
1977/78	86	14 16%	1 1%
1978/79	83	22 27%	3 4%
1979/80	89	24 27%	2 2%
1980/81	69	46 67%	13 19%
1981/82	75	27 36%	10 13%
1982/83	48	10 21%	7 15%

Table 5.9: Contracts overlapping into Financial Years and not-finalized todate.

There is no logic in such circumstances to make an eight week job to be let after the middle of May in any year. The finances voted have been less and less, meaning that every year the ministry offers less and less jobs and as such should have had an easier time managing the few jobs. Table 5.9 shows the number of jobs that overlapped financial years thereby forcing funds that could have been utilized in an earlier year to eat into the next year's funds. This is painful considering the degree of underfunding. In 1980/81 46 jobs overlapped into the following year(s) representing 67% of all jobs contracted in that year. It will be remembered that it is the same year that the provincial quantity surveyor decided to run contracts without reference to the provincial maintenance surveyor. Harmony is the key to organization success and this high percentage of overlap supports it. In 1981/82 the overlap was 27 jobs representing 36% while in 1982/83 it was 10 jobs representing 21%.

A works programme is made because there are many parties affected by the performance of a job. There are the managers, the users who want to be inconvenienced least and the performers (direct labour or contractors). The performers hold a key role in the successful implementation of the programme and as such must be closely controlled by the management. We have seen in chapter three the deficiencies in the registration of contractors. The doubtful competence of many of the contractors coupled with the lack of control on the

part of the management has therefore contributed greatly to the great time overruns and the overlaps. So even if MOWH&PP made excellent maintenance programmes, there would be little success in achieving the scheduled times if the contractors cannot be disciplined. The first step towards such discipline would be for the ministry to start accepting only reasonable tenders and not necessarily the lowest. In this respect the provincial management would need the support of the upper management who have in the past ordered the acceptance of some lowest tenders when petitioned by these tenderers. This would enhance the probability that the majority of contracts would be completed satisfactorily and in time because of the reasonable rates. In 1980/81 the reasonable rates for painting two coats of first quality plastic emulsion paint was Kshs. 12.00 per square metre. However, the majority of tenders were accepted with rates as low as Kshs. 6.00. One instance involved a contractor who quoted Kshs. 4.00 and was advised that his rates were too low. His argument was that he had a lot of paint in stock which he could use to execute the work. On being informally advised that he would fetch more money if he sold the paint, he reiterated that he wanted to prove his worth to the ministry. The offer was eventually accepted but the contractor could not complete the work. MOWH&PP understands better than the contractors which rates are reasonable and they should therefore not delegate this decision to the contractors.

Secondly MOWH&PP must put into effective use clauses 25, 26 and 27 of the Contract Agreement. These clauses deal with damages for non-completion, delay and extension of time and determination of contracts respectively. Of the 1980/81 contracts 13 have not been finalized, with 10 for 1981/82 and 1 for 1982/83. Despite the many contracts that have not been completed in time, not a single contractor has been made to pay for damages for non-completion. Extension of time has become a formality so that a contractor who delays due to his own mismanagement will cook up any of the reasons acceptable to the ministry and the extension will be granted. The leniency or collusion by MOWH&PP management is therefore responsible for the time overrun, financial year overlap and the non finalization of many contracts. The contract agreement clauses are control instruments that are not being effectively used and even if there were efficient programmes they would be valueless.

Not to be overlooked is the fact that most of the contractors depend on interim payments so that they plough back these finances into the project. It has been described how the payment vouchers pass through many officers in the province and again in the head office. No effort was made to find out how long it takes a voucher to go through these processes. However, a random check through the Contract Record Books showed that even commencing the processing of payment from the time a payment is requested by a

Number of Jobs	Time Taken to start Processing Payments (Weeks)
6	2
7	10
5	20
1	30
2	40
1	50

Table 5.10: Time Lag Between Request for Payment and Commencement of the Process.

contractor could take upto even fifty weeks (Table 5.10). Inefficiency is therefore deep in the management of maintenance works.

The provincial maintenance surveyor must therefore establish under him a planning and control unit which would be responsible for the preparation of all maintenance programmes. The unit would fix the dates when each job would be tendered, accepted and commenced. One snag that would cause difficulties to the unit is the fact that tenders have to be processed through the ministry headquarters. It is the opinion of this study that the processing of tenders through the head office should be stopped to make this unit's work easier. Major maintenance funds should be voted to the PWO in two halves to enable the province plan and control its expenditure without coming across the head office bottle necks. After fixing the dates for the jobs the unit would then co-ordinate the surveys and release to the contracts and quantities unit the jobs in good time for tendering as scheduled. During the execution phase, the planning and control unit would have all the site weekly reports channelled to them so that it can monitor the progress of each job and effectively invoke clauses 25, 26 and 27 when the need arises. And to ensure that payment to contractors is not unduly delayed, it would be responsible for recommending payments and ensuring that it is not held up in the process. All payments should be made at the provincial level to cut out the delays caused by the many head office procedures.

It is only then that the province would programme and have all the processes within its control.

Minor Maintenance

What is shown in table 5.3 are the minor day-to-day requests put to the various depots by occupants. Success in attending to these requests would potray MOWH&PP as effective because generally occupants report what really affects their use of the buildings. Lack of materials as a defence by MOWH&PP is not wholly acceptable because we have seen funds being surrendered at the end of the year. The growing back log in table 5.3 is partly attributable to poor stock control. The ill in the purchasing process is that responsiblity is scattered over the process without overall coordination. The DWO after placing a requisition sits back and will be armed with the answer, "I have placed an order for the materials and we have to wait until they are delivered." The attitude is generally to wait for the DSO to play his part. The DSO after calling quotations and recommending to which supplier an LPO should be sent breathes a sigh of relief. By the time it reaches the accounts department it is already too far away from the initiators who are responsible for the works and accountable for any delays.

Although inventory management studies state that the lead time can be determined to regulate the ordering of materials, the situation is made worse by the nature of suppliers. It is stipulated that materials should be

supplied within fourteen days of the LPO date but a number of suppliers tend to keep the LPOs indefinitely. Coupled with lack of control over expenditure this has led to the balances shown in tables 5.5 to 5.7. Control here would require that the planning and control unit mentioned earlier analyses the occurence of maintenance requests by trade and quantities. The types and quantities of materials required can then be weighed against the vote for minor maintenance and a purchasing programme worked out. It would then be the unit's responsibility to monitor all requisitions from inception to delivery, making sure that no suppliers hold LPOs indefinitely. The absence of such a unit is therefore responsible for the unspent balances, partly to inadequacy of materials and the growing backlog.

The management laid blame on Supplies Branch for the difficulties they have in getting classified materials. Materials like paint could be available easily through term contracts but with its complementary, brushes (classified) not available, work would not continue. Requisitions could be held at the Supplies Branch for even more than six months, at times the requisitions being returned at the close of the financial year with or without authority to purchase the materials locally. But by then it is already too late to initiate any purchases. To verify the extent to which the Supplies Branch may be contributing to the backlog the study decided to compare the backlog among trades. The aim of the comparison is to determine the performance of the

YEAR	PLUMBING		CAPENTRY		ELECTRICAL	
	Jobs Reported	Backlog	Jobs Reported	Backlog	Jobs Reported	Backlog
1980/81	4076	1668 40.9%	3248	1480 45.6%	4264	1224 28.7%
1981/82	2880	1020 35.4%	2424	672 27.7%	3704	1168 31.5%
1982/83	2240	724 33.3%	2248	768 34.2%	2712	908 33.9%
1983/84	2904	880 30.3%	2584	1140 44.1%	3352	1652 49.3%
TOTAL	12100	4292 35.5%	10504	4060 38.7%	14032	4952 35.3%

Table 5.11: Comparison of Backlog among Trades
Machakos Road Depot, MOWH&PP Nairobi Province

YEAR	BUILDINGS	ELECTRICAL
1980/81	6.7%	-
1981/82	35.6%	32.0%
1982/83	44.4%	38.0%
1983/84	38.3%	48.8%
AVERAGE	39.0%	39.3%

Table 5.12: Comparison between Building and Electrical Trade Backlogs Park Road Depot, MOWH&PP Nairobi Province

electrical unit whose materials are not classified as opposed to many items from the other building trades. A glance at Table 5.11, the year 1980/81 would make one believe that electrical works have a lower percentage backlog which may be attributed to other factors including that none of its materials do not need to be requisitioned from Supplies Branch. But the backlog continues to grow and finally the electrical trade shows the biggest percentage in 1983/84. The percentages show that the electrical trade performs just as bad as the building trades. Except for the slightly high percentage for capentry (Machakos Road), electrical has a very slight edge over plumbing which has got most of its materials classified. The Park Road averages at table 5.12 on the other hand show that the buildings trades have an edge over electrical. So it can be concluded that even the frustrating processes of the Supplies Branch do not significantly contribute to the inefficiency inherent in MOWH&PP Nairobi province. Inefficiency is derived in part from lack of creation of lead time which is an important aspect of day-to-day maintenance work.

The interviews held revealed that more attention is paid to newer jobs. If a job is reported and materials ordered for it, it is unlikely that the materials will be used for the job. The practice is such that if a new job is reported and this report comes simultanously with materials that were ordered for an earlier job, the materials will be used for the new job and even no

no replacement order may be made so that the pending job will pend indefinitely. Bampton[6] has stated that something over 90% of all maintenance jobs can be regarded as not requiring immediate attention. This provides scope for greater control and organization. Advantage of this opportunity is not taken such that when a job is reported all work instructions are dumped in a pending tray if it is not executed the same day, without any classification as to priorities (plate 7). There is only one work instruction sheet and before materials are available it will be pended by the supervisor of the area in question. Generally the supervisors are very busy assigning duties to artizans and running to sites, sometimes at short notice so that they have very little time to prioritize the works and prepare execution schedules for them. It is therefore necessary to have the planning and control unit which will group the works according to priorities and locations, monitor the delivery of materials and inform the supervisor accordingly when he should avail the operatives for execution.

The transport handicap is attributable to the beaucracy (long procedures for purchasing spares) and the placing of this responsibility in the wrong hands. According to one head of department, the office superintendent who is in charge of transport does not seem to trust the mechanics who work under him so that he is always suspicious of their requests for spares.

One supervisor said that they are just managing because the majority of artizans have some degree of dedication to duty and walk long distances at times carrying delicate glass sheets, block boards and even heavy tins of paint. At times occupants offer transport. However, it is common knowledge that fuel costs have been rising rapidly since 1973 and hence the need to rely less and less on vehicle transport. MOWH&PP should rethink about the boundaries set in 1980. Until a ministerial directive during one of his tours of government estates and depots in 1982, Jogoo Road Phase I residents had to report their defects to Park Road more than five kilometres away while Embakasi Depot is actually situated in the estate. Park Road has still to travel about five kilometres to the city centre when Kenyatta International Conference Centre (KICC) is a fully fledged depot with all the necessary facilities and located within fify metres of Harambee House, Lands Office, Sheria House, Attorney General's Chambers, Law Courts, Jogoo Houses, Treasury, Herufi House, Police Headquarters, Parliament Buildings, Old Treasury and Government Printer. These are multi-storey blocks with a lot of minor maintenance works from time to time and the switching of their maintenance from Park Road to KICC would result into great savings in travelling time and costs (plate 8).

It can be noticed from the backlog table 5.3 that Kahawa depot has the poorest record. The poor records are attributable to the fact that Kahawa works the least hours. Kahawa is situated about sixteen kilometres

from MOWH&PP Shauri Moyo camp where most of its staff reside. It has been an old practice to transport the workers to and from Kahawa everyday. When the depot had a lorry on the road it was easier but all the same work could not start in time. At present the depot operates a 16 - passenger pick-up which must transport more than 100 workers every day. The amount of fuel involved is very costly. Then it is not until about 10,00 am that work may be allocated to the artizans. They have to leave early so that the vehicle may be kept by 5.00 pm as required by the government.

The Kahawa case therefore demonstrates the need to have a "mall" in large establishments. The "malling" concept involves the incorporation of a small workshop, store and maintenance staff quarters in every large establishment of say a given number of units. The maintenance team then becomes part of that community. It should create cordial relations between the users and the maintenance team. Transport costs would be reduced to a minimum so that one vehicle can serve many of these communities by just transporting materials from the main depot to the community store. The communities that deserve these "malls" are Administration Police Training College, Embakasi, General Service Unit Training College, Embakasi, Embakasi Village. All these are more than ten kilometres from the depot that serves them. The others are Kenya Institute of Administration (KIA), Kabete Veterinary Laboratories, General Service Unit Headquarters, National Youth Service, Co-operative

College, Karen, and Langata Barracks. Some of these like KIA and Langata Barracks are sub-depots but the workers have to report to the main depots before being transported to the sub-depots and this takes too much valuable time. There is therefore the need to move depots nearer the concentration of building and creating "malls" in large establishments.

Although lack of materials and transport are the only reasons that are listed as the causes of outstanding works, the study noted that there is a lot of wastage in the use of the existing manpower. A random check on the work instruction sheets showed that the works last between 1-3 hours with the majority lasting about two hours. Apart from not being able to confirm the reliability of the durations entered by the artizans it was discovered that in only 22 out of 100 cases did the artizans handle more than one work instruction in a day and none of them totalled more than five hours. A generalization can therefore be made that non-productive time for nearly 80% of the workers disregarding the obvious non-productive time like travelling to site, getting out tools etc is more than 60% (plate 9).

Whereas it could be said that lack of adequate transport could be a contributing factor to this high non-productive time because the workers cannot be shifted from one site to another, it is generally due to lack of introduction of delay time to give room for organizing and planning and then grouping works

according to locality. The scarce transport's usage is not carefully planned so that one could find a gang of electrical trades artizans travelling in one vehicle and building trades artizans travelling in another and in the end the vehicles come to one site. The idea of this wasted fuel may not strike a supervisor who is only interested in clearing works that fall within his jurisdiction. There is need to train him to understand the high costs and ineffectiveness of ad hoc maintenance, to understand that a missing or defective internal door lock must not necessarily be made good the same day and may be pended and that probably within fourteen days there will be other requests from the same area and that economies of scale may now warrant that a vehicle and a team of artizans can move to that area and work on the problems affecting that area for a whole day.

But probably the worst undoing of the ministry is to demotivate its workers which definitely must have contributed to the low level performance. Bampton[7] has demonstrated how through work study based bonus schemes productivity can be enhanced. In his illustration productivity was increased by nearly 30%. In MOWH&PP apart from the absence of such a scheme the artizans are at times seen not to be getting just rewards for the their efforts. There are over 100 artizans (Kileleshwa alone has 45) who have attained minimum grade three trade certificate or higher but are still employed as subordinate staff. Some of them have held these certificates for more than three years and work

independently and yet they continue to draw labourers' salaries. The provincial maintenance office should lobby the head office so that this group may be promoted. But the provincial maintenance team is composed of maintenance surveyors who feel equally frustrated. It is a team of young University graduates who joined the ministry with vigour and hope of working for results and commensurate financial rewards. As it stands right now after ten years of service and with acquired experience and advanced training all of them except one are still in the job group they entered the ministry. The whole maintenance team is therefore frustrated so that it is possible they could sit back and watch things go out of hand without showing the necessary concern. The upper management must therefore look into and accord the members of the maintenance team their rightful grades and the commensurate financial rewards to give them the minimum of motivation before the higher level bonus schemes can be thought of. Noting that financial rewards would not be enough motivation, the upper management must bear in mind that this young team would get a lot of satisfaction from improved performance and that the provision of adequate finances might be enough challenge for them.

Consequential Losses

Consequential losses are losses attributable to the long procedures that have been established to regulate the operations of an organization. On the other hand these losses may occur not due to the procedures but

due to ineffective management. Long procedures is a sickness of bureaucracy and it causes a rigidity such that just actions may be condemned as being out of procedure. In adhering to the long procedures a lot of time is wasted thereby culminating into financial losses. Generally, decisions are suspended until the top and responsibility and accountability is spread along the chain so that the source or cause of the losses is in most cases clouded.

In MOWH&PP losses that can be attributed to the long procedures and ineffective management can generally be classified into two categories:

(i) long-term; and

(ii) short-term losses.

The long-term losses accumulate gradually over a long period of time and it may not be easy to notice or quantity them. A building is always in a constant deteroriation motion whether it is constantly repaired and maintained or not. However, the degree of deteroriation between a regularly maintained building and a neglected one vary. Neglected buildings deteroriate faster and would need to be replaced earlier than a well maintained house. The physical survey indicated that government buildings are not well maintained and as such deteroriating at a faster rate than normal. This represents a huge capital loss to the government which can only be realized in the long run.

The study learnt that in times of scarcity of funds the ministry tends to lay more emphasis in carrying out repairs rather than redecoration. Most affected are

are MOWH&PP direct labour especially the painters most of whom were found to be idle or engaged in other duties like demolitions. But MOWH&PP due to its inefficiency have not been able to realize this labour-on-cost element and have continued to let most of the painting jobs to outside contractors most of whom are very inefficient and ineffective. The end result is that large sums of money is paid to underutilized labour while at the same time paying for poor workmanship and the administrative costs of keeping contractors on site for too long. The poor workmanship would have to be made good at extra cost sooner than should have been necessary. In the long run these costs will grow and would not be commensurate with the total work done to the buildings during their life-time.

The short-term losses include water overflows and burst pipes that cannot be repaired immediately. The figures attributable to these leaks could not be easily obtained but cases where the ministry pays the City Commission for wasted water are numerous. However, the most glaring losses that can be attributed to the ministry's bureaucracy and ineffective management are the abortive rents paid for vacant houses awaiting handing over to their owners after the expiry of their leases. The government rents property from individuals and organizations and at the end of the leases the government is supposed to hand them back in good and tenantable condition. Table 5.13 shows how long some premises have had to stay vacant and the abortive rents

DURATION PREMISES VACANT MONTHS	EXTRA RENT PAID KSHS.
11	60,500.00
11	77,000.00
28	196,000.00
27	327,483.85
10	75,483.75
5	33,250.00
14	84,000.00
-	268,700.00
6	325,325.00
14	72,000.00
17	93,500.00
	1,613,242.600

Table 5.13 Extra Rents Paid Due to Delay in Handing over Rented Premises April 1981-1984

Source: File No. 41/55/41

paid.

The reasons advanced for these delays are:

(i) burglary;

(ii) lack of accessibility to some premises;

(iii) insufficient funds;

(iv) landlords not availing themselves for handing/taking over;

(v) slow contractors and poor workmanship;

(vi) landlords not accepting amount offered.

The housing section informs the PWO to repair and redecorate buildings for handing over by a given date. The occupant is also informed of the expiry of the lease and given alternative accommodation. The occupant should then inform the PWO when he is vacating so that he can be inspected out of the building after which the PWO starts to carry out the necessary repairs. During this period the ministry continues to pay rent.

Burglary arises when the occupant vacates the the premises and fails to report this to the ministry or he may still report but the ministry fails to provide security for the premises. On the part of the occupant not reporting his vacation it can be argued that quite a number of civil servants do not know many procedures except for those related to their jobs. Some may not know where to report when they are vacating premises. Some may know but due to negligence will take a day or two to take the right action, by which time burglary will have taken place. The second reason advanced by the ministry as failure to get accessibility to some

premises testifies to this fact of civil servants who do not know what to do in given situations. This calls for mass education of occupants by providing write-ups on the "do's and dont's" as far as their occupation of the premises is concerned. If this is not in the form of a manual then they should be brief notes framed and hanged to the wall.

However, section L 10 of the Code of Regulations[8] states that the proposed date of vacation should be notified to the MOWH&PP authorities by letter. Failure to comply should be viewed as negligence and therefore such occupants should be responsible for the costs arising from such burglaries. Investigations revealed that no surcharges have been levied on such occupants. In the case where the occupier reports but the ministry fails to provide security in time, it has been very difficult to pinpoint the source of breakdown because responsibility and accountability is dissipated among the officers along the chain. The housing section passes the buck to the PWO when there are queries on delays. The PWO then checks with the PMS who will pass the buck to the security officer. The security officer pleads lack of enough watchmen and the matter is back to the head office which is responsible for recruitment of staff.

MOWH&PP Nairobi province should not plead inadequate funds in this case. They are aware of the consequential financial losses (short term) that are likely to occur if a building is not handed back

in time. At least in any given year the funds allocated are always sufficient for such buildings. Handing over of buildings should therefore take priority over other jobs that do not pose any threat to losses. The balance of funds can then be directed to other jobs like roof leaks, burst pipes with other painting works at the lowest level of the priorities. Property owners who have not identified their new tenants have a habit of not availing themselves for taking over of their premises. In such cases the ministry should inform the landlord by registered post the date for handing over and that if the landlord fails to appear the ministry will abdicate responsibility pertaining to rent and security of the premises.

We have seen how slow the contractors are. They may escape with poor workmanship in government owned buildings but not with rented property because landlords are particular about quality. It was due to the quality of workmanship required of buildings for handing over and the time limit factor that the ministry opted to negotiate such jobs with African contractors. Most contractors did good jobs but a minority of them still proved incompetent. Negotiation of such jobs however came to a standstill in 1981 when the Chief Secretary decided that negotiations had served their purpose and should be no more.[9] This was the beginning of the huge backlogs of buildings for handing over. Two buildings which stayed vacant for 27 and 28 months before being handed over date back to this period. Such jobs therefore need to be negotiated with a

few African contractors whose performances have been ascertained to be efficient and effective.

Earlier on in 1980 the Chief Superintending Architect (Maintenance) had proposed that instead of engaging contractors, time and money could be saved by paying off to the landlords the costs of repairs and redecoration. His argument was that there would be savings in that the preliminaries would not be paid and money would not be tied down in the form of provisional sums. The other saving would be repair and redecoration period. This method is now widely practised but the delays continue to exist. First, the documents leading to the paying off of landlords follow the same channels as those of contractors and some landlords do not sign until they have received payment. Secondly MOWH&PP rates are generally on the lower side of the market rates hence some landlords do not accept the ministry's offers. Furthermore, some landlords insist on being given an allowance repair and redecoration period in terms of rent equivalent to the period. If some landlords are given this allowance while some are not given then uniformity is lacking. It also defeats the third aim of this method and if there are no appreciable savings then the ministry should think of its duty of building an African based construction industry by negotiating these jobs with competent African contractors.

So MOWH&PP has failed to satisfy the occupants that it serves by keeping the buildings under its responsibility in a sound state. The ineffectiveness is due to lack of adequate funds and poor organization in the use of whatever is allocated to them. As Daft puts it, the ability of an organization to function efficiently depends upon the authority structure.[10] As shown, the authority structure in MOWH&PP, both at the headquarters and Nairobi Province are defective because service departments are on the same level of authority with implementing departments. In Nairobi province, it is even made worse creating room for dissent by placing a senior superintendent of buildings (senior in rank to provincial maintenance surveyor) under the provincial maintenance surveyor. This inefficiency is however not only in MOWH&PP but the whole civil service as the Chief Secretary noted recently that the inefficiency is due to lack of committment to duty and the chain of command system.[11] The chain of command system could cause lack of committment to duty. On the other hand it could be caused by lack of motivation. Inefficiency in MOWH&PP can also be attributed to the centralization of authority. As potrayed the burden of the work lies on the middle managers (PWO,PMS) and yet they do not have authority to make some important decisions. So the failures of Nairobi province are not wholly theirs. The head office has contributed to some of these failures.

The ministry has also failed to set standards or goals at which to aim and making realistic long-term and annual programmes to achieve them. Even short-term programmes are lacking. Long and unnecessary procedures also contribute to the ineffectiveness. It is duplication of duty to have contract documents vetted by quantity surveyors in the province and then forwarded to the head office for vetting by other quantity surveyors of the same qualifications. Major maintenance funds should be allocated to the province in two halves to enable the province effectively plan its spending as they are more conversant with their priorities. Contract conditions should be adhered to so that inefficient contractors now registered with the ministry may be disciplined or deregistered. However, the ministry should at the same time involve itself more in the training of contractors to improve on their understanding of the sub-industry. In the execution of minor maintenance works, there should be more emphasis in prioritizing jobs and creating a lead time to enable planning more economical use of labour, time and transport resources. In this respect there is need to train the supervisors to understand the intricacies of maintenance as their training has been geared to development works. Motivation is also lacking in that the artizans and the managers mark time in their job groups for periods longer than necessary.

However, what was found to be most serious with MOWH&PP is the absence of a self-evaluation system. It operates a rather ad hoc system so that there is no

use of records to learn about the past and make predictions for the future (plate 10). There is great need for the ministry to examine most of its procedures and make improvements where necessary. By altering methods and procedures, it may be possible to gain as much as 25% improvement in productivity.[12] As a whole the self-evaluation system should commence with the establishment of a technical information system (manuals). These can help reduce the direct costs of maintenance and the indirect costs which result from lost production, faulty output and consequential losses.

FOOTNOTES

1. M.G. Hicks and C.R. Gullet, Organization: Theory and Behaviour (Auckland, McGraw-Hill Inc., 1981), p. 396.

2. K.A. Wahab, "Maintenance Management and Physical Performance of Buildings," The Tropical Environment: A Publication of the University of Nigeria, Volume 1, Number 1 (March, 1980), pp. 103-109.

3. Republic of Kenya, Office of the President, Code of Regulations, (Nairobi, 1965).

4. Reginald Lee, Building Maintenance Management, (London, Granada Publishing, 1981), pp. 113-114.

5. Reginald Lee, Building Maintenance Management, pp. 113-114.

6. E. Bampton, "Improving Productivity in the Execution of Maintenance Works," Maintenance Information Service, The Chartered Institute of Building, no. 12 (1980).

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9. Chief Architect to Permanent Secretary, 16 March 1982, Ministry of Works Housing and Physical Planning, B.K1/3/97.

10. R.L. Daft, Organization Theory and Design (New York, West Publising Company, 1983), p. 125.

11. Sunday Nation (Nairobi), 21 April 1985, p. 3, Col. 1.

12. E. Bampton, "Improving Productivity in the Execution of Maintenance Works.

Plate I: MOWH&PP Shauri Moyo Estate. Leaking pipes created conditions for biological growth on this building in the MOWH&PP Shauri Moyo Estate. This indicates lack of effectiveness in the ministry's building maintenance operations.

Plate II: Government Quarters, Jogoo Road Phase I. Walls stained by leaking pipes potraying lack of care for government buildings.

Plate III: MOWH&PP Estate Shauri Moyo, Nairobi. House knocked by a public service vehicle over two years ago. Accommodation is largely inadequate and such losses should be curbed by immediate repair and claiming damages from the vehicle company. This indicates the lack of a maintenance policy that is compatible with national housing policy goals and thereby underlining the conclusion of this study that maintenance as an essential service is yet to be recorgnized.

Plate IV: MOWH&PP Shauri Moyo Estate.
A communal toilet. Manhole filled with stones and surrounded by foul water. WC pans are broken and blocked with faeces all over the floors. The health of the users of the users of this facility is endangered. This shows that the ministry is failing to comply with even the lowest standards that may be interpreted from the Public Health Act Cap 242 Laws of Kenya.

Plate V: HG 58, State House Road. This building is an eyesore in the midst of beautiful bungalows, flats and maisonettes in this high class residential area. Shows lack of care and standards not being compatible with the surrounding. The management should also ask itself it it is more economical to continue maintaining it.

Plate VI: MOWH&PP Machakos Road Yard, Nairobi. Vehicles play an important role in building maintenance operations. The grounding of these vehicles, all of which are serviceable has largely contributed to the ministry's ineffective performance in building maintenance.

Plate VII: Work allocattion office. Machakos Road, Nairobi. Work instructions bundled in a "pending tray" instead of being filed in a proper manner to allow for planning their execution.

Plate VIII: The Old Treasury and Kenyatta International Conference Centre (KICC). Cost growth not appreciated by MOWH&PP. Other than the need to repair the down pipe the wall will have to be painted. The Old Treasury is maintained from Park Road, more than five kilometres away and yet KICC only three minutes' walk away has a full fledged depot. Other than the Old Treasury there are about ten multi-storey buildings within walking distance from KICC but maintained from Park Road thereby resulting to unnecessary transport costs.

Plate IX: MOWH&PP Machakos Road, Nairobi. Picture taken at midday. Artizans not adequately deployed due to lack of materials and transport.

Plate X: Costing Office, Machakos Road, Nairobi. Costing records loosely slipped into folders and into the pigeon holes making retrieval of information difficult. Apparently, this information is never analysed.

Plate XI: HG 58 State House Road. Electrical rewire done more than three years ago but not painted. Lack of cordination between the electrical and building maintenance units.

Plate XII: Mombasa House, government rented offices for IDA/IBRD. Most of the transactions conducted here involve World Bank officials. Other, than the floor not conforming to the prestige (standards) commensurate to the nature of its business, its uneveness is a danger to its users. The ministry pleaded lack of materials to repair the floor and yet funds are returned to the Treasury at the end of every year. The picture shows lack of setting standards compatible with the activities of the building and failure to plan execution of identified or reported work.

CHAPTER SIX

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

Summary

In examining the effectiveness and efficiency of the ministry of Works, Housing and Physical Planning in organizing and executing building maintenance works it was necessary to first of all place the built environment in society and examine the role that it plays. The built environment is central in the production of man's wants and needs like rest, goods and services that are necessary for his continued livelihood and the future generations to which he owes responsibility and accountability. The built environment represents a colossal amount of capital investment and hence the need to give great consideration to its maintenance. It is also a source of pride for a community depending on its status.

The study has gone on to note that despite this central role, colossal sums spent on putting it up and the pride it gives a community, its maintenance leaves a lot to be desired. The paradox of this is that the provision of the built environment has failed to match the growing Kenyan population at 4.1%. It is a paradox because the failure to meet the growing demand should have been an incentive to preserve whatever is already in stock. The paradox is a reflection of the failure to appreciate the long term gains that would accrue

from building maintenance. The study therefore goes ahead to state that it is important to maintain our built environment if we are to realize greater value for this capital debt. It shows our appreciation of our investments' worth.

Building maintenance is a science whose management employs management principles of planning, organizing, directing, controlling and evaluating the performance achieved against the set objectives. A maintenance organization must therefore set its practices with the gains to be achieved very clear to the organization. It must therefore set its objectives and work out a plan of achieving them.

MOWH&PP must be having its set practices and it is these set practices and structure that this study was interested in evaluating their suitability to the organization's objectives. Do the results achieved through these practices potray effectiveness and efficiency within the organization? The practices of MOWH&PP are compared against a model organization and the extent to which they deviate from the model are discussed in the light of the results achieved by the ministry. The study is restricted to the ministry's Nairobi province.

Although very little study has been done in building maintenance in Kenya, the developed countries have set a lead and it is clear from these studies that the production technology of building maintenance is the same and there are only minor variations due to the size

of an organization. In the main all organizations strive to satisfy the ccnsumers, in this case being the occupants/users of buildings. This satisfaction is the measure of effectiveness. Organizations must also strive to be efficient in their drive towards effectiveness by using the resources at their disposal in the most economical manner. Efficiency will be derived from the nature of the structure and processes in the organizations. The structure and process must be suited tc the tasks facing the organization.

MOWH&PP maintenance department must therefore act as an advisor to the top management, set up the framework within which it operates and then be able to evaluate and appraise its performance. It must also have a balance between planned and unplanned maintenance. A positive looking maintenance organization should be aware of its workload and hence the need to set standards. The required standards of maintenance should depend on how much the failure to achieve the set standard will affect the objectives of the users-of the building. Not that the standards expressed must be achieved but that its expression is a major benchmark towards effective and efficient execution of maintenance works as it provides a basis for control which is a rule for an efficient organization. Failure to achieve the set standards will only act as stimilus to ask why the standards were not achieved and then a reorganization may be effected in order to achieve them.

After the standards have helped determine the workload, the workload is now weighed against the resources available and then long-term, annual and short-term programmes can be prepared to guide the execution of the works. Execution will then be carried out either through direct labour or contract labour. Whichever method is chosen it must show advantages over the other. Indiscriminate tendering gives rise to low prices and hence poor workmanship and waste of resources. It is therefore recommended that a standing approved list of contractors be maintained. It is also recommended that the employer should have the last word in determining which tender should be accepted because the lowest tender is not necessarily the best. The processing of tender documents should not be allowed to intefere with the programme already prepared. Similarly the payment system should not hold the progress of the works.

The basic problem in executing works through direct labour organizations is to ensure that all the various trades and materials are on site at the correct time and that the client is inconvenienced as little as possible. This requires planning which involves correct sequencing of activities and good estimation of their durations. A bar chart may be used in this phase as a tool for controlling the progress of work. Day-to-day maintenance flow in at irregular and unpredictable intervals. The use of records should help here to determine their frequencies and types for analysis and organizing how to carry them out efficiently. A lead time and a priority

list should then guide in organizing how to execute the works. A work order system is used at this stage to control and regulate work input.

To ensure availability of materials in the stores, the organization should first assess its store needs in relation to its workload and types of jobs. It is important that materials should be available as and when required for execution of urgent repairs. These stores will need to be checked regularly to detect any errors in inventory records and obselescence or deteroriation of materials. The study then lays emphasis on how the organization should measure its own performance and also the relative performance of alternatives methods of execution like direct labour and contract labour.

MOWH&PP Nairobi Province is part of a larger organization and large in size and must of necessity rely on formalization of procedures so that it can use impersonal means of control. With the five depots, the province should ideally have a structure that is geographically decentralized and since the work is carried out in the depots as much authority as necessary should also be decentralized to enable faster decision making. The decentralized authority should be accompanied with accountability so that officers become responsible for their actions or ommissions rather than hiding behind other officers which is common with centralized systems.

Records show that the maintenance unit is under the Chief Architect's office in the architectural department. The maintenance unit is however now combined with the housing section with its head reporting directly to the permanent secretary. MOWH&PP Nairobi province is under the control of the provincial works officer (PWO) with the maintenance unit forming a department headed by a provincial maintenance surveyor (PMS). The structure is seen not to be suitable because a service department like contracts and quantities units head is on the same level of authority as the PMS. A component unit like electrical and mechanical services is separated from building maintenance unit and may result into some activities being carried out without necessary cordination. The province then branches out into five depots which are headed by sub-professionals whose training was mainly geared towards development works and do not understand the intricacies involved in maintenance works.

The ministry categorizes its work as:

(i) major maintenance works,

(ii) minor maintenance works,

(iii) maintenance of essential services.

Major maintenance works are those which cost more than K£2,000. They are identified by the PWO and programmed for execution the following year. Minor maintenance works are those which cost less than K£2,000 and are mainly the day-to-day requests from occupants.

Essential services also fall under the major and minor categories as discussed. The ministry has not set any standards and operates a contingency system so that many defects are likely to exist for a very long time before being made good. The annual programmes are not prepared properly and there was no evidence of short-term programmes.

MOWH&PP Nairobi province was found to be having a poor integration due to lengthy processes. The administrative system is slow in transmitting information down and up the hierarchy thereby having a poor vertical linkage. Departmental heads meetings as a means of integration have been lacking in positiveness. The same issues tend to be the centre of discussion in these meetings without any evaluation being done on the success or failure of the previous meetings' resolutions.

The ministry employs contractors drawn from a list of approved contractors that it keeps. The contractors are however not put to appropriate scrutiny before registration so that quite a number of them perform below par. Acceptance of the lowest tenderer unless the tenderer withdraws even when it is underpriced is dangerous for the ministry. For major jobs the PWO has to apply for funds from the head office. The head office and more so the Chief Quantity Surveyor's office is far away from the occupants and have no feeling of urgency for any of the jobs and may as well interfere with the programmes prepared by the province. The tender processing and payment systems are long and cause unnecessary delays. Laxity in the application of

clauses 25, 26 and 27 of the contract agreement was found to be rampant in the ministry.

Minor maintenance requests are received and recorded in a Work Instruction book before it is transferred to a Work Instruction Sheet. The sheet is then allocated to an artizan by a supervisor. The work order system for the ministry was found to be defective in that the work order sheets do not have provision for important information like priorities to be assigned each job and estimated and actual labour hours. There is also no lead time which is essential for planning execution of day-to-day maintenance works.

All purchases of building materials are done centrally for all depcts by the Divisional Supplies Officer stationed at the provincial headquarters. The procurement of materials is also plagued by the rather long and discouraging procedures which consume much valuable time. Further, many "trialist" suppliers hold onto orders placed with them for too long, and at times failing to supply materials completely. The ministry also does not act fast enough to cancel these orders if the suppliers fail to deliver the materials within the stipulated time.

The study found out that due to the deficiencies in the structure and practices in MOWH&PP Nairobi province, government buildings have very many defects some of which have been outstanding for many years. The users of government buildings are therefore generally dissatisfied with the maintenance department's

performance. The backlog in minor maintenance works continues to grow every year with one depot being able to attend to only 15% of the requests in 1982/83. Contracts also in most cases overrun their scheduled periods with some overlapping into the next financial years unnecessarily while others remain unfinalized for even more than three years.

Other than inadequacy of funds the poor performance is a result of overcentralization of authority in the head office and the failure of the provincial team to put into use the accepted maintenance management practices:

(i) there are no objectives/standards set by the ministry;

(ii) the ministry is not aware when various elements in buildings would require replacement so that they can plan their inspections and replace the elements in time before they can cause further damage;

(iii) repair works carried out in many of the rented houses that have been burgled could have been avoided. Requests are also attended to without regarding if the defect is due to normal wear and tear or the occupant's carelessness. The study did not however find out if some of the repair works are due to design or constructional faults and whether the remedial measures are appropriate;

(iv) the ministry does not cost work before operatives move to site. Estimates are however, prepared for major maintenance works for the purposes of applying for funds;

(v) no work study has been done to enable the fixing of start and finish times for individual jobs so that the works can be planned at times in relation to user activities;

(vi) the continued employment of ineffective contractors when direct labour is underutilized is an indication that the merits and demerits of the two methods are not appreciated by the ministry; and finally

(vii) the ministry has got no formal systems for feedback of information on progress so that actual costs and performance can be compared with those predicted and remedial action taken if necessary.

The first objective of this study was to analyse the ministry's current maintenance management practices. An attempt has been made to analyse the practices as much as possible. A study of "organizing" should adequately cover the placement of human beings in the system. The positions of the provincial works officer, provincial maintenance surveyor, provincial quantity surveyor and others have been discussed.

However, the quality and quantity of the total manpower requirement for the province has not been adequately discussed. It was not possible for this study to discuss these aspects of manpower because it was not feasible to determine within the available time the province's total workload and break it down into sub units corresponding to the various cadres of manpower. It is however hoped that future studies may take up this aspect and discuss it adequately. Also not discussed along the manpower line is the nature of training appropriate for the various cadres of staff especially the technicians, clerks and operatives.

The second objective was to determine to what extent the ministry's practices deviate from or conform with the model and the shortcomings that may be attributable to the possible deviations. The study has highlighted the deviations with the short comings attributable to them being seen in the poor condition of buildings, user dissatisfaction, a growing backlog, contracts overrunning their scheduled times, and consequential losses discussed in chapter five. The shortcomings reflect failure to achieve some benefits which ought to have been gained by the organization. Lee[1] has classified the benefits to be gained as financial, technical or human. He further says some of these benefits are difficult to quantify but some attempt should be made to express them in money terms so that the analysis can be as complete as possible. This analysis has not been fully accomplished by

the study and it is hoped future researchers may be able to quantify the benefits that the ministry's Nairobi province has not been able to gain.

Conclusions

In concluding, this study will attempt to answer why government buildings are neglected and left to dilapidate at will. The answer may seem obvious, namely, lack of adequate funds and failure to apply accepted maintenance management principles. But then why are funds so inadequate to the extent that at one time there is a short-fall of about 80%? Or why are the accepted principles not applied? There is therefore only one major conclusion. We have not lived with the permanent building long enough to learn the importance of keeping it in a sound condition. There has been no conscious comparison of the life span of a well maintained building and that which is not regularly maintained so that the general assumption is that once a permanent building is put up, it is indeed permanent. The building's condition is taken for granted despite its central role in man's life and the pride that it is supposed to give the owners and the community. The deteroriation of the condition of a building is very slow and realizing the long-term loss associated with its characteristic "slow death" comes late and some times is not realized by the owners. This attitude is therefore wide spread and the policy makers in the government would seem to have the attitude too.

The maintenance of K£ 500,000,000 worth of government building stock does not seem to be appreciated by the policy makers. They have provided the funds for building it up and its care is not as important as putting it up. It is this attitude that has resulted in the Treasury underfunding building maintenance activities.

If the above conclusion holds water, then it can be concluded further that since the maintenance of buildings is taken for granted then the persons reponsible for their maintenance are also taken for granted. It is the conviction of this study that this conclusion is logical because how else can the stagnation of the maintenance surveyors be explained. The first two maintenance surveyors joined the ministry in 1974 in job group "J". The next ten joined the following year with another lot of eight joining in January, 1978 all in the same job group. The first maintenance surveyor went for a post-graduate course (MSc Building Maintenance Management) in 1979 and on his return in 1980 was promoted to job group "K". The second lot of five went for the same course in 1980 and returned the following year. Their request for promotion to job group "K" seemed to have sparked off problems as someone argued that it was wrong for them to have been employed in job group "J". It culminated into a series of events including their demotion to a lower job group and stopping their annual increaments which were only lifted in October, 1984 when they were "promoted" to job group "J".

In the meantime, their contemporaries who joined the ministry or other ministries at the same time are two or three job groups ahead. This treatment is directed to a team that is charged with looking after a capital investment of K£500,000,000. Naturally this kind of treatment may deject even the hardest worker and their morale may be subconsciously lowered to its lowest.

But people also work for results. They would achieve some degree of satisfaction if the work they do is progressive. The inadequacy of funds therefore seems to be growing at the same rate as the dissatisfaction or the seemingly down-going morale and the combined growth may well be the cause of the growing ineffectiveness. It is not to be forgotten that even at the lowest level many of the subordinate staff have made great efforts to learn various trades with the ambition of both working more satisfactorily and getting a commensurate financial reward but failing to get considered for promotion. The lowered morale should therefore be the answer to the reason why there exists no technical manuals, no standards, no long-term programmes, poorly prepared annual programmes, no short-term programmes, no evaluation of performance by use of existing records. Initially after return from the post-graduate studies the maintenance surveyors were enthusiastic and even a maintenance operations manual was prepared. It has neither been approved nor rejected. Also prepared was a new format work instruction sheet with adequate information for analysis.

When the initial copies ran out about two years ago no effort has been made to print more.

Recommendations

In the light of the ineffectiveness and the inefficiency in MOWH&PP, Nairobi province, the study has come up with recommendations that should help improve the performance of the department:

(i) Educating the policy makers on the importance of building maintenance. This would involve the holding of seminars on building maintenance. It would further involve an analysis of the performance of buildings and the consequences of not maintaining them regularly. It may improve on the allocation of building maintenance funds by the Treasury.

(ii) Restructuring the organization so that it is suited to its tasks. It would involve:

(a) service departments to second personnel to work in the maintenance department so that these services are offered from within under the control of the provincial maintenance surveyor;

(b) relinquishing more decision making to the province so that programmes of work made by the province are not rendered useless by head office processes.

(c) relinquishing more decision making to the depots so that the depots can have more control over day-to-day maintenance;

(d) the provincial maintenance surveyor should have a planning and control unit responsible for making long-term, annual and short-term programmes for major maintenance works. The unit will also be responsible for coordination with component departments like electrical and mechanical. A similar unit should be created under each depot works officer responsible for planning and controlling minor maintenance works;

(iii) Process reorganization so that the accepted management tools may be applied. This would include:

(a) preparation of building maintenance manuals as the base for technical information system;

(b) determining the standards of maintenance required for various types of buildings or components;

(c) setting up a planned maintenance system as discussed in chapter two;

(d) preparation of long-term, annual and short-term programmes as discussed in chapter two;

(e) making effective use of clauses 25, 26 and 27 of the contract agreement;

(f) processing all tenders within the province so that the province may have complete control over its programmes;

(g) all payments be made at the province;

(h) lead time and priorities be introduced in the depots to allow for planning and control of day-to-day maintenance works;

(i) use of records to evaluate performance and make any necessary changes if the set goal is not achieved.

(iv) The training of maintenance surveyors in building maintenance management is commendable. There is, however, need to train the technicians too on both maintenance management and technology. The concept of a multi-craft tradesman is already accepted in Britain and it is time the artizans are encouraged to acquire this training, with commensurate remuneration after completion of training.

(v) The ministry should get more involved in the training of contractors so that they can have a better understanding of the sub-industry.

(vi) The ministry should motivate its workers by promoting them when due or merited.

(vii) The ministry should encourage the maintenance surveyors to conduct more research as these may result into:

(a) fixing compatible standards for various building components;

(b) realistic estimation for job durations and hence realistic programmes;

(c) appropriate incentive bonus schemes;

(d) maintenance information feedback to designers;

(e) any other positive results that may enhance effectiveness and efficiency.

(viii) Encourage the occupants to understand the building, its components and the treatment they require and to be able to carry out some minor works without calling up the ministry. In the same fashion, government ministries could be authorised to make own arrangements to carry out some categories of minor works.

(ix) All future designs for large estates and institutions cater for a maintenance workshop, store and accommodation for a few artizans.

(x) These recommendations be brought to the attention of Ministry of Works, Housing and Physical Planning.

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TO: FORWARD PLANNING GROUP
M.O.W. Buildings Department
P.O. Box 30260 Nairobi

PROJECT SUBMISSION SHEET

Submitting Ministry / Agency	Letter Reference	Date	
Job Location (Place / District / Province)		Vote	Sub-Vote
Job Name		Head	Sub-Head
Description of Work Required			
Priority Ranking A( ) B( ) C( ) Check one only / See over for note	Comments about priority ranking / Justification		
Has a site been obtained? Yes( ) No( ) If No, site available by (Date)			
Ministry / Agency Representative for this Job (Name / Postal Address / Telephone Number)			
Name of Submitting Officer Signed	Date Received by M.O.W./F.P.G.		

OPK (L)

MOW form 4.1 2/74

APPENDIX B

ANNUAL MAJOR MAINTENANCE WORKS PROGRAMME (AMMWP) — MOW & H FORM 4.38

VOTE | MINISTRY OF WORKS & HOUSING | WORKS PROVINCE | YEAR 19.....

PRIORITY	ITEM NUMBER	JOB NUMBER	REFERENCE IN ESTIMATES	DESCRIPTION OF JOB	Est. TOTAL COST	SPENT AS PER 30-6	19..... PROVISION	D.R	REMARKS

MINISTRY OF WORKS—BUILDINGS DEPARTMENT

Index	Ref. No.

PLANNED PREVENTATIVE MAINTENANCE
MECHANICAL PLANT RECORD CARD

Equipment	Province	
	Building	
	Location	

Manufacturer	
Serial No.	
Rating	
Capacity	
Date Installed	
Agents	
Maintenance Contract	
Auxiliary Equipment	

APPENDIX D

c.c. Chief Architect
Accountant Buildings
Finance
Examination
Cash Flow
F.113/2/15

REPUBLIC OF KENYA

AUTHORITY TO INCUR EXPENDITURE

A.I.E. No. 103/3/43/79/80

Supplementary to A.I.E. .....

To:— The Provincial Buildings Works Officer, Ministry of Works, NAIROBI.

From:— The Permanent Secretary, Ministry of Works, NAIROBI.

Your reference .....

Our reference B.C.9/6/46 of 3rd April, 1980

You are hereby authorized to incur expenditure during the financial year 1979/80 amounting to K£.37,447 as detailed below in accordance with the Financial Regulations of Kenya.

2. The number of this Authority must be quoted on all vouchers as the authority for expenditure against the item(s) specified. Please note this Authority in your vote book and ensure that the expenditure which you incur does not exceed the amount authorized. You will be held personally responsible if you incur expenditure without proper authority or in excess of the amounts allocated to you.

Date 6th May, 1980

POUNDS: Thirty seven thousand four hundred and forty seven only.

Signature .....(W.O.Obadha).....

Designation for: PERMANENT SECRETARY

Vote	Account Number	Description of Work or Service	Expenditure Authorized Sh.
R.13-M.O.W.	Various(See attached list)	Being allocation of maintenance funds for the fourth quarter issue 1979/80 in the respect of head 409 item 250. (W.M. KUIA) for: CHIEF ACCOUNTANT	748,940/=

A/C GEN. 30

GPK 1013—50m—7/76

APPENDIX E

APPLICATION FOR FUNDS

FROM: P.E.W.C.
[illegible], Nairobi Province
REF: R.13/976/16.
DATE: 4th June, 1980.

TO: Chief ~~Quantity Surveyor~~ Architect,
Ministry of Works
P. O. Box 30260
Nairobi (Att: Mr. [illegible])

I Description of Work					
Works Prog. Item Number			Description of Job		Ministry / Agency
R.13	NB	976.	Repairs and Redecoration to HG/113 including S/Quarters and garage.		
Vote	Province	Number			
Job Number			Reference	D.R.	Vote Holder (If MOW)
0177 UU			132 - 409	P.E.W.C.	☐ P.E. ☐ Chief Arch.

IIa Type of Agreement	IIb Method of Contracting
☐ Main Contract	☐ Tenders
☐ Sub Contract	☐ Negotiation
☐ Variation Order to Contract No. 0177 UU	☐ Single Tender Action
☐ The work will be carried out by Departmental Labour	

III Details of Tender			
Name of Contractor	Date Tender Rec'd	Contract Period	Amount of Tender to be accepted
M/s. Bridenn Gen. Const. & Renovators, P.O. Box 46802, Nairobi.	02.80	4 weeks	K£ 2691.25

IV Breakdown of Funds Required ☐ New job ☒ Additional funds on an on-going job

YEAR	1979/80	19 /	19 /	TOTAL
BY CONTRACT	K£[illegible]17.50			K£[illegible]17.50
BY MOW				
TOTAL	K£[illegible]17.50			K£[illegible]17.50

This breakdown of funds is based on the assumption that construction will start no later than 197

The value of work WILL / WILL NOT exceed £5000. Tender documents ARE / ARE NOT enclosed.
The work WILL / WILL NOT be executed as part of a Group Contract. (Delete as necessary)

Signed ________ Date ______ (P.E. or Group Leader)	Signed ________ Date ______ (Chief Quantity Surveyor)

GPK [illegible]

MOW form 6.62 ([illegible])

FORM M.o.W. 362 (REV.)

MINISTRY OF WORKS BUILDING REGISTER DETAIL SHEET

CALITY.	HOUSING NUMBER	REGISTER NUMBER.
.SCRIPTION.		DRAWING NUMBERS.

INTH AREAS BY STOREYS. 1st SQ.FT. 2nd SQ.FT. 3rd SQ.FT.

IGINAL BUILDINGS ITIONS & ALTERATIONS	TYPE	WALLS	FLOOR	ROOF	FINISH	WATER	SANIT.	ELECT.	VALUATION CODE	PLINTH AREA

TE OF CONST.	COST	S.L. No.	RATE VALUE	RENTAL CLASSIFICATION.

VALUATION

DE.	PLINTH AREA	PRICE	VALUE

SPECIAL EQUIPMENT

APPENDIX G

CONFIDENTIAL

Form No. .....
(For Official Use)

Application No. .....

To:

The Secretary,
Registration Committee,
Ministry of Works, Housing and Physical Planning,
P.O. Box 30260,
Nairobi.

Thro' Provincial Works Officer,
Ministry of Works, Housing and Physical Planning,
P.O. Box .....
.....

Date .....

APPLICATION FOR INCLUSION IN THE M.O.W., H. & P.P. LIST OF APPROVED CONTRACTORS

1. Name of the Company (Registered under the Companies Act) .....
.....
2. Address to which all communications should be sent .....
.....
3. Telephone No. .....
4. Name of Bank .....
Branch .....
Box Number .....
Is the Account held at this Bank in the name of the Company? .....
.....
Is the Account held at this Bank a Current/Deposit Account?
(Delete as necessary)
5. Location of Office .....
6. Location of Workshop .....
7. In which Province are you prepared to work .....
8. Indicate the kind of work your Firm can undertake.

	State the Value of Work you are prepared to undertake.
(i) Building	Sh. .....
(ii) Civil Engineering	Sh. .....
(iii) Roads	Sh. .....
(iv) Electrical*	Sh. .....
(v) Plumbing*	Sh. .....
(vi) Sewers*	Sh. .....
(vii) Carpentry and Joinery	Sh. .....
(viii) Painting	Sh. .....
(ix)	Sh. .....
(x)	Sh. .....

*Contractors applying for inclusion under the Heading of Electrical, Plumbing and Sewers must attach a copy of their current Licences.

APPENDIX G

9. Give the names of two persons whom references can be obtained. (References from Partners or Relatives are not acceptable.)

(a) Name .....

Address .....

Occupation or Profession .....

(b) Name .....

Address .....

Occupation or Profession .....

10. In connection with your application please complete the following:

(a) Date of Registration with K.A.B.C.E.C., K.A.A.C. or other Organization:

Date ..... Organization .....

(b) All applicants should attach copies of Certificates of Registration with Registrar of Companies

(c) Are you an Incorporated Company? Yes/No.

(d) If so with or without Liability?

With .....

Without .....

(e) Name of Owner/s, Partners or Directors: (Applications will not be considered without this information).

Name ..... Kenya Citizen. Yes/No.

Name ..... Kenya Citizen. Yes/No.

Name ..... Kenya Citizen. Yes/No.
(Delete as necessary)

(If more than three Owners, Partners or Directors, submit a separate list with this application)

(Documentary evidence on Citizenship if Non-African must be attached to this Application)

Do you or any of your Partners have any connections with any other Firm which has or will submit an Application for Registration? Yes/No.

If yes please give details .....

.....

(f) Who in your Firm has attended Training Courses? State names of Courses, where attended, when attended, subjects taken.

.....

.....

.....

(g) What Equipment do you own	where can it be inspected	Is it subject to Hire Purchase Agreement

(h) What Transport do you own	where can it be inspected	Is it subject to Hire Purchase

(i) Do you possess valid T.L.B. permits to operate these vehicles? .....

(j) Has your Firm at any time been included on the list of Contractors of the N.C.C. or a Provincial Works Officers?

If so, give details .....

.....

.....

.....

(k) Give details of the Contracts you have completed within the last five years:

Place, Project and Description of works	Value	Contract No. (if known)	Client	Date Commenced	Date Completed
(a)					
(b)					
(c)					
(d)					
(e)					
(f)					
(g)					

NOTE—Under the heading of Client the applicant is requested to state the Architect, Municipality, Government Department, Organization.

We, Messrs. ..... hereby submit this application and confirm that all facts are to the best of our knowledge true and correct. It is clearly understood that the decision of the Registration Committee is Final and that in the event of non-registration no correspondence will be entered into.

Signature .....

APPENDIX G

4

FOR OFFICIAL USE ONLY

CONFIDENTIAL REPORT ON CONTRACTORS

Contractor's Name .....

Bank References .....

Personal References .....

.....

Plant Inspected: Location ..... Comment .....

Previous Works Inspected: Site ..... Comment .....

Reports on Completed Works .....

Standard of Work .....

(a) Concrete Works .....

(b) Stone Work .....

(c) Carpentry and Joinery .....

(d) Plastering .....

(e) Electrical Works .....

(f) Plumbing Works .....

(g) Drainage Works .....

(h) Painting Works .....

(i) Other .....

(j) Site Organization .....

(k) Speed .....

REMARKS AND RECOMMENDATIONS

.....

.....

.....

.....

Signed .....
Provincial Works Officer

Approved/Not Approved by Registration Committee.

Signed .....
SECRETARY OF COMMITTEE

GPK 1854—5m—11/63

APPENDIX H

ANNEX 6F

TENDER REPORT

From (GL/PE/SSB):	To (CA thro' CQS/PE):
Ref: Date:	

Details of Works				
WP Item Number			Description of Job	Ministry/Agency
Vote	Prov	No.		
Job Number		Reference(s)	DR CA ☐ PE ☐ CON ☐	Vote Holder CA ☐ PE ☐ CM ☐

Details of Tender		
Name/Address of Tenderer	Type of Contract ☐ Main contract ☐ Sub-contract	Date opened Tender Amount $
Type of Work ☐ Building ☐ Mech/Elec ☐ Other(Specify)_____		Est/Prime Cost $

Remarks

Attached please find a report on tenders and the original schedule of tenders received for the above works.

You will note that the amount of the recommended tender is/is not* in excess of the approved estimated total amount of funds available for the works.

The source of funds for this tender will be:

☐ new contract ☐ PC Sum ☐ savings on contract ☐ contingency sum ☐ additional funds

A MOW AIE is/is not* required prior to accepting this tender.

_____ _____

Date Signed: Group Leader/Provincial Engineer/Sr. Supt. Buildings*

* delete as necessary

Authority to Process the Tender	CQS Use Only
The tender for the above works is authorized for processing subject to the issue of an AIE where required. _____ _____ Date Signed: Chief Architect Prov. Eng.*	

Copies: Chief Quantity Surveyor
Consultant Architect (if any) } - with enclosures

ORIGINAL (for Contractor) Serial No. .....

Name of Contract .....

Contract Number .....

MINISTRY OF WORKS SITE INSTRUCTION

To: .....

.....

Date ..... Signed ..... Clerk of Works

Date ..... Countersigned ..... D R

GPK (L)

APPENDIX J

M.O.W. 39

REPUBLIC OF KENYA

MINISTRY OF WORKS AND HOUSING

Contract No. _____ Order No. _____

VARIATION ORDER

Name of Contract _____

To _____

_____

You are hereby instructed to execute the following variation on the above contract.

No objection to this order will be entertained unless lodged in writing with the D.R. within ten days from the date of issue to the Contractor.

	Sh.	cts.

_____ D.R.

_____, 19____

GPK 2659—20m—11/67

APPENDIX K

SITE WEEKLY REPORT

CONTRACT No. | | | |

WORKS PROGRAMME ITEM No. _____

JOB _____

CONTRACTOR _____

WEEK ENDING | | | | | |

WEEK No. | | of

1.00	GENERAL PROGRESS (By Block or Phase as appropriate)	ACTION
	(Continue on separate sheet if necessary)	
2.00	SITE INSTRUCTIONS ISSUED	
3.00	INFORMATION REQUIRED	
4.00	INFORMATION RECEIVED	

APPENDIX L

ANNEX 8R

CERTIFICATE OF PRACTICAL COMPLETION

From: (DR) Ref: Date:	To: Chief Architect MOW Buildings Department PO Box 30260 Nairobi (Att: Group Leader)

Details of Works				
WP Item Number			Description of Job	Ministry/Agency
Vote	Prov	No		
Contract Number			Name/Address of Contractor	

Completion of Building Works

Delete (a) or (b)

(a) The Contracts Works

(b) The part of the Works here listed:

_____

_____

_____

are now complete to my satisfaction, subject to the items noted overleaf and are ready to be handed over to the Client Ministry.

_____ Date

_____ Building Supervisor (MOW or Consult)

Completion of Mechanical/Electrical Works

The mechanical/electrical installations on the above works have been completed and tested to my satisfaction.

_____ Date

_____ M/E Supervisor (MOW or Consultant)

Release of Retention and Surety Bond

Att: Job QS and Contracts Register Office

The first moiety of the retention and the surety bond may now be released.

_____ Date

_____ Departmental Representative

Copies: Building and M/E Supervisors
Job QS and CRO

APPENDIX L

ANNEX 8R

CERTIFICATE OF PRACTICAL COMPLETION

From: (DR) Ref: Date:	To: Chief Architect MOW Buildings Department PO Box 30260 Nairobi (Att: Group Leader)

Details of Works				
WP Item Number			Description of Job	Ministry/Agency
Vote	Prov	No		
Contract Number			Name/Address of Contractor	

Completion of Building Works

Delete (a) or (b)

(a) The Contracts Works

(b) The part of the Works here listed:

_____

_____

_____

are now complete to my satisfaction, subject to the items noted overleaf and are ready to be handed over to the Client Ministry.

_____ _____

Date — Building Supervisor (MOW or Consult)

Completion of Mechanical/Electrical Works

The mechanical/electrical installations on the above works have been completed and tested to my satisfaction.

_____ _____

Date — M/E Supervisor (MOW or Consultant)

Release of Retention and Surety Bond

Att: Job QS and Contracts Register Office

The first moiety of the retention and the surety bond may now be released.

_____ _____

Date — Departmental Representative

Copies: Building and M/E Supervisors
Job QS and CRO

APPENDIX M

M.O.W P.P. 121

REPUBLIC OF KENYA

MINISTRY OF WORKS, HOUSING AND PHYSICAL PLANNING

STATEMENT FOR PAYMENT ON ACCOUNT

CERTIFICATE NO. .....

CONTRACT NO. AND DATE .....

NAME OF WORKS .....

NAME OF CONTRACTOR .....

Note.—In the preparation of certificates for payments on account the valuation of work done should be arrived at by abstracting such items as wholly or partially completed from the Bill of Quantities, or, in the absence of the latter, by taking detail measurements of completed work priced out at rates proportional to the Contract Amount. These detail measurements must be recorded in the books provided for the purpose, which shall be kept at the office dealing with the work, and carefully checked totals of the various items shall be entered on this Form. The valuation appearing herein shall be of the work done from the commencement *not* from the date of the last preceding payment on account, and, when the work is more than half completed, is best arrived at by deducting the value of the work *remaining to be done* from the Contract Amount. Such procedure greatly minimizes the risk of overpayment.

The valuation of materials on site shall follow that of the work done but shall be entered and transferred under a separate heading.

A copy of this Statement must be sent to the Chief Accountant, M.O.W.H. and P.P. for transmission to the Auditor.

VALUATION of work done and materials on site for the .....

..... PAYMENT OF ACCOUNT UP TO ..... 19.....

Item No.	Description	Quantity	Unit	Rate	Sh.	cts.
	Carried to collection on page			Sh.		

G.P.K. 958—3000—2/64

REPUBLIC OF KENYA

PAYMENT VOUCHER

(VOTED PROVISION)

Payee's Name and Address__________

Particulars	LPO/LSO No.	[illegible] No.	Amount	
			Sh.	Cts.

Amount payable (in words) Total Sh. ______

Shillings __________

__________ Cts. ______

Authority Reference No. __________

EXAMINATION

Voucher Examined by __________

Date __________

Internal Audit

____

VOTE CERTIFICATE

I certify that the expenditure has been entered in the Vote Book and that a [illegible] against the chargeable item is shown here below.

Approved Estimates/Allocation—

Item No. ______ K.Sh. ______

Less: Total expenditure plus commitments K.Sh. ______

Balance — K.Sh. ______

Less: THIS ENTRY—Vch.

No. ______ K.Sh. ______

Balance — K.Sh. ______

Date ______ Signature ______

[illegible]

AUTHORITY HOLDER CERTIFICATE

I certify that the expenditure detailed above has been incurred for the authorized purpose and should be charged to the item shown here below.

____

Signature — *[illegible] Holder*

Date ______

AUTHORIZATION

I certify that the [illegible] according to regulation [illegible] expenditure has been [illegible] charged [illegible] certificate [illegible] I hereby AUTHORIZE payment of the amount shown above without any alteration.

Signature ______

Accounting Officer [illegible]

Date ______

Vote	Head	Sub-Head	Item

A.I.E. No.	Account No.	Dept. Vch. No.	Station	Cash Book		Amount	
				Vch. No.	Date	Sh.	cts.

APPENDIX N

M.O.W. 123

SUMMARY OF

STATEMENT FOR PAYMENT ON ACCOUNT

NAME OF WORK____

CONTRACT NO.________________ CERTIFICATE NO.____________________

DATE____________________,19___

AMOUNT OF CONTRACT, Sh.______________________________cts

	Sh.	cts.	Sh.	cts.
Value of Permanent work done, including extra work if any. From page_________				
Value of Materials on site. From page_________				
GROSS VALUE PAYABLE .. .. Sh.				
Less 10 per cent retention money				
NET TOTAL .. Sh.				
Less previous payments on account as follows:	Sh.	cts.		
1st Payment dated__________Vr.No.__________				
2nd Payment dated__________Vr. No.__________				
3rd Payment dated__________Vr. No.__________				
____________________				
____________________				
____________________				
____________________				
____________________				
____________________				
____________________				
____________________				
____________________				
TOTAL PAYMENTS ON ACCOUNT .. .. Sh.				
AMOUNT OF__________PAYMENT ON ACCOUNT .. .. Sh.				
NOW DUE TO CONTRACTOR .. .. Sh.				

______________________________D.R.

Date__________________________,19___

______________________________Contractor.

Date__________________________,19___

GPK 2649—40m—11.62—2(B31)

APPENDIX Q

ANNEX 8S

CERTIFICATE OF MAKING GOOD DEFECTS

From: (DR) Ref: Date:	To: Chief Architect MOW Buildings Department PO Box 30260 Nairobi (Att: Group Leader)

Details of Work				
AP Item Number			Description of Job	Ministry/Agency
Vote	Prov	No		
Contract Number			Name/Address of Contractor	

Certification

Maintenance repairs were completed on the above works by Messrs _____ on _____ 19__.

_____ _____
Date Building Supervisor (MOW or Consultant)

_____ _____
Date M/E Supervisor (MOW or Consultant)

Release of Retention

Att: Job QS

The second moiety of the retention may now be released.

_____ _____
Date Departmental Representative

Copies: Building Supervisor
M/E Supervisor
Job QS
Provincial Engineer (where CA = DR or CON = DR)

THIS FORM IS APPLICABLE WHERE BILLS OF QUANTITIES DO NOT (EXCEPT IN RELATION TO CERTAIN PROVISIONAL WORKS) FORM PART OF THE CONTRACT

CONTRACT No. .....

REPUBLIC OF KENYA

MINISTRY OF WORKS

CONTRACT AGREEMENT (1970 EDITION)

Articles of Agreement made the ..... day of ..... 19.....

Stamp to be impressed here

BETWEEN the Government of the Republic of Kenya (hereinafter called "the Government") of the one part and .....

..... of .....

(hereinafter called "the Contractor") of the other part.

WHEREAS the Government is desirous of .....

.....

..... at ..... and has caused Drawings and Specification describing the work to be done to be prepared.

AND WHEREAS the said Drawings as listed on pages .....:..... of the Specification (hereinafter referred to as the "Contract Drawings") and the Specification have been signed by or on behalf of the parties hereto:—

NOW IT IS AGREED AS FOLLOWS:—

1. For the consideration hereinafter mentioned the Contractor will upon and subject to the conditions annexed hereto execute and complete the works shown upon the said Drawings and described by or referred to in the said Specification and Conditions.

2. The Government will pay to the Contractor the sum of Kenya Shillings .....

..... (Sh. K.....) (hereinafter referred to as the "Contract Sum") or such other sum as shall become payable hereunder at the times and in the manner specified in the said Conditions.

In witness whereof the parties hereto have hereunto set their hands the day and year first above written.

Signed for and on behalf of the said Government.

.....

Permanent Secretary for Works

In the presence of:—

Name .....

Address .....

.....

Description .....

Signed

*by the said:—

*for and on behalf of the said:—

.....

.....

In the presence of:—

Name .....

Address .....

.....

Description .....

*Delete whichever is not applicable.

THE CONDITIONS HEREINBEFORE REFERRED TO

Definition of terms.

1. (i) The Departmental Representative (hereinafter referred to as the D.R.) shall for the purpose of this Contract be the person so designated by the person signing the Contract on behalf of the Government.

(ii) D.R. The term "D.R." wherever used hereinafter and in all Contract Documents shall be deemed to imply the Departmental Representative or such person or persons as may be duly authorized to represent him on behalf of the Government or the successors in office of such person or persons and also such person or persons as may be deputed by such representative to act on his behalf for the purpose of this particular Contract.

During the continuance of this Contract any person acting for the D.R. or exercising his authority shall not disregard or overrule any decision, approval or direction given to the Contractor, in writing, by his predecessor unless he is satisfied that such action will cause no pecuniary loss to the Contractor or unless such action be ordered as a variation to be adjusted as hereinafter provided.

(iii) *Approved and Directed.* The term "Approved" and "Directed" wherever used hereinafter and in all Contract Documents shall mean respectively approved and directed in writing by the D.R.

(iv) *Contractor.* The term "Contractor" wherever used hereinafter and in all Contract Documents shall mean the person or persons, partnership, firm or company whose tender for this work has been accepted and who has or have signed this Contract and shall include his or their heirs, executors, administrators, assigns, successors, and duly appointed representatives.

(v) *Works.* The term "Works" wherever used hereinafter and in all Contract Documents shall mean all or any portion of the work, materials and articles, wherever the same are being manufactured or prepared, which are to be used in the execution of this Contract, including the work of all sub-contractors and all work in variations, and whether the same may be on the site of the buildings or not.

(vi) *Specification.* The term "Specification" wherever used hereinafter and in all Contract Documents shall mean the Ministry of Works General Specification of the date last before issued together with the Particular Specification prepared for the Contract.

Scope of Contract.

2. The Contractor shall carry out and complete the works in accordance with this Contract in every respect in compliance with the directions and to the satisfaction of the D.R. If the Contractor shall find any discrepancy in or divergence between the Contract Drawings and/or Specification he shall immediately refer the same in writing to the D.R. and specifically apply in writing for any necessary instructions from the D.R. in relation thereto. The D.R. may in his absolute discretion and from time to time issue further drawings, details and/or written instructions, written directions and written explanations (all of which are hereinafter collectively referred to as "D.R.'s Instructions") in regard to:—

(*a*) The variation or modification of the design, quality or quantity of the works or the addition or omission or substitution of any work.

(*b*) Any discrepancy or divergence between the Contract Drawings and/or the Specification and Drawings (provided that figured dimensions are to be followed in preference to scale)

(*c*) The removal from the site of any materials brought thereon by the Contractor and the substitution of any other materials therefor.

(*d*) The removal and/or re-execution of any works executed by the Contractor.

(*e*) The postponement of any work to be executed under the provisions of this Contract.

(*f*) The dismissal from the works of any person employed thereupon.

(*g*) The opening up for inspection of any work covered up.

(*h*) The amending and making good of any defects under clause 18 of these Conditions.

(*i*) The expenditure of prime cost and provisional sums included in the Specification and of prime cost sums which arise as a result of instructions issued in regard to the expenditure of provisional sums.

If any verbal instructions, directions or explanations involving a variation are given to the Contractor or his foreman upon the works by the D.R. or by the Clerk of Works, such instructions, directions or explanations shall be confirmed in writing by the Contractor to the D.R. within seven days, and if not dissented from in writing by the D.R. to the Contractor within a further seven days shall be deemed to be the D.R.'s instructions. The Contractor shall forthwith comply with all D.R.'s instructions. If compliance with D.R.'s Instructions involves any variation, such variations shall be dealt with under clause 13 of these Conditions and the value thereof shall be added to or deducted from the Contract Sum.

If compliance with D.R.'s Instructions involves the Contractor in loss or expense beyond that provided for in or reasonably contemplated by this Contract, then, unless such instructions were issued by reason of some breach of this Contract by the Contractor, the amount of such loss or expense shall be ascertained by the D.R. and shall be added to the Contract Sum.

Notwithstanding anything to the contrary herein appearing, D.R.'s Instructions in relation to any discrepancy or divergence as mentioned above shall not constitute a variation nor involve any addition to or deduction from the Contract Sum unless the D.R. shall so direct in writing.

If within seven days after receipt of a written notice from the D.R. requiring compliance with D.R.'s instructions the Contractor does not comply therewith, the Government may employ and pay other persons to execute any work whatsoever which may be necessary to give effect to such instructions and all costs incurred in connexion therewith shall be recoverable from the Contractor by the Government as a debt or may be deducted by the D.R. from any moneys due or to become due to the Contractor under this Contract.

Drawings, Specification, Schedule of Rates and Provisional Bills of Quantities.

3. The Contractor shall furnish to the D.R. on the signing of this Contract a fully priced copy of his estimate upon which his tender has been based unless it has already been furnished. At the discretion of the Government provisional Bills of Quantities shall be attached to the Specification in respect of those parts of the works of which the extent has not been decided at the time of tendering. Such provisional Bills of Quantities shall be priced by the Contractor and shall be deemed to be a part of his estimate and the total thereof shall be included as part of his tender. Where such provisional Bills of Quantities are not

attached or where they do not contain quantities of work in foundations, drainage and external works, the unit rates of all such work shall be inserted by the Contractor in the aforementioned estimate upon which his tender has been based. All prices shall be in Kenya Shillings. The Contract Drawings and the said priced copy of estimate and provisional Bills of Quantities shall remain in the custody of the D.R. and the D.R. shall furnish to the Contractor one complete copy of all the Contract Documents. The D.R. without charge to the Contractor shall on the signing of this Contract furnish him with two copies of the Contract Drawings and two unpriced copies of the Specification and of provisional Bill of Quantities, if any, and shall within a reasonable time also furnish him with such further drawings as are reasonably necessary to enable him to carry out all D.R.'s Instructions and with any further details which in the opinion of the D.R. are necessary for the execution of any part of the work. The Contractor shall keep one copy of the Contract Drawings and unpriced Specification and provisional Bills of Quantities, if any, on the works so as to be available to the D.R. or his representative at all reasonable times. Upon receiving final payment the Contractor shall forthwith return to the D.R. all Drawings Specifications and provisional Bills of Quantities. None of the documents hereinbefore mentioned shall be used by either of the parties hereto for any purpose other than this Contract and neither the Government nor the D.R. shall divulge or use except for the purpose of the Contract any information contained in the priced estimate.

Contractor to provide everything necessary.

4. The Contractor shall provide everything necessary for the proper execution of the works according to the true intent and meaning of the Drawings and Specification taken together and if the Contractor finds any discrepancy therein he shall immediately and in writing refer the same to the D.R. who shall decide the procedure to be followed.

Local and other authorities' notices and fees.

5. (*a*) The Contractor shall comply with and give all notices required by any regulation, Act or by-law of any local authority or of any public service, company or authority who have any jurisdiction with regard to the works or with whose systems the same are or will be connected and he shall pay and indemnify the Government against any fees or charges legally demandable under any regulation or by-law in respect of the works: provided that the said fees and charges if not expressly included in the Contract Sum or stated by way of provisional sum shall be added to the Contract Sum.

(*b*) The Contractor before making any variation from the Contract Drawings or Specification necessitated by such compliance shall give to the D.R. written notice specifying and giving the reason for such variaton and applyng for instructions in reference thereto.

(*c*) If the Contractor within seven days of having applied for the same does not receive such instructions, he shall proceed with the work conforming to the provision, regulation or by-law in question and any variation thereby necessitated shall be deemed to be a variation under clause 13 of these Conditinos.

Supervision and working hours.

6. The works shall be executed under the direction and to the entire satisfaction in all respects of the D.R. The working hours shall be those generally worked by good employers in the Building and Civil Engineering Trades in Kenya. No work shall be carried out at night or on gazetted holidays unless the D.R. so directs.

Fair wages.

7. The contractor shall, in respect of all persons employed anywhere by him in the execution of the Contract, and further in respect of all persons employed by him otherwise than in the execution of the Contract in every factory, workshop or place occupied or used by him for the execution of the Contract observe and fulfil the following conditions:—

(*a*) The Contractor shall pay rates of wages and observe hours and conditions of labour not less favourable than those established for the trade or industry in the district where the work is carried out by machinery of negotiation or arbitration to which the parties are organizations of employers and trade unions representative respectively of substantial proportions of the employers and workers engaged in the trade or industry in the district.

(*b*) In the absence of any rates of wages, hours or conditions of labour so established the Contractor shall pay rates of wages and observe hours and conditions of labour which are not less favourable than the general level of wages, hours and conditions observed by other employers whose general circumstances in the trade or industry in which the Contractor is engaged are similar.

(*c*) Where the absence of established rates of wages, hours and conditions of labour or the dissimilarity of the general circumstances in the trade or industry in which the Contractor is engaged prevent the Contractor observing rates of wages, hours and conditions of labour ascertained under subparagraphs (*a*) or (*b*) above the Contractor in fixing the rates of wages, hours and conditions of labour of his employees shall be guided by the advice of the Labour Department.

(*d*) The Contractor shall recognize the freedom of his employees to be members of trade unions.

(*e*) The Contractor shall maintain records in English of the time worked by and the wages paid to, his employees adequate to show that he is complying with the requirements of this clause.

(*f*) The Contractor shall at all times during the continuance of the Contract display, for the information of his employees in every factory, workshop or place occupied or used by him for the execution of the Contract a copy of this clause, together with a notice setting out the general rates of wages, hours and conditions of labour of his employees.

(*g*) The Contractor shall be responsible for the observance of this clause by sub-contractors employed in the execution of this Contract and shall, if required, notify the Government of the names and addresses of all such sub contractors.

(*h*) Any Contractor or sub-contractor who is found to be in breach of the Fair Wages clause shall cease to be approved as a Contractor or sub-Contractor for such period as the Permanent Secretary for Works may determine.

(*i*) Should a claim be made to Government alleging the Contractor's default in payment of Fair Wages of any workman employed on the Contract and if proof thereof satisfactory to the D.R. is furnished by the Labour Department the D.R. may failing payment by the Contractor pay the claim out of moneys due or which may become due to the Contractor under the Contract.

(*j*) The Contractor shall furnish to the Government if called upon to do so such particulars of the rates of wages, hours and conditions of labour referred to above as the Government may direct.

Setting out of works.

8. The D.R. shall furnish to the Contractor, either by way of carefully dimensioned drawings or by personal supervision at the time of setting out the works such information as shall enable the Contractor to set out the enclosing walls of the building at ground level after which the Contractor shall be responsible and shall at his own cost amend any errors arising from his own inaccurate setting out unless the D.R. shall decide otherwise in writing.

Materials and workmanship to conform to description.

9. All materials and workmanship shall so far as procurable be of the respective kinds described in the Specification and the Contractor shall upon the request of the D.R. furnish him with vouchers to prove that the materials comply therewith. The Contractor shall arrange for and/or carry out any test of any materials which the D.R. may in writing require and the cost thereof shall be added to the Contract Sum unless provided for in Specification or unless the test shows that the said materials and/or workmanship are not in accordance with this Contract.

Foreman.

10. The Contractor shall constantly keep upon the works a competent general foreman capable of speaking and writing English intelligibly, and any instruction given to him by the D.R. shall be deemed to be given to the Contractor in pursuance of clause 2 of these Conditions.

Access for D.R. to works.

11. The D.R. and/or his representatives shall at all reasonable times have access to the works and/or to the workshops or other places of the Contractor where work is being prepared for the Contract and in so far as work in virtue of any sub-contract is to be so prepared, in workshops or other places of a sub-contractor, the Contractor shall also by a term in the sub-contract so far as is possible secure a similar right of access to those workshops or places for the D.R. and his representatives and shall do all things reasonably necessary to make such right effective.

Clerk of works.

12. The Government shall be entitled to appoint a Clerk of Works, Inspector of Works or Foreman whose duty shall be to act solely as Inspector on behalf of the Government under the directions of the D.R. and the Contractor shall afford every facility for the performance of that duty.

Ascertainment of prices for variations.

13. At the discretion of the D.R. or at the request of the Contractor, to which the D.R. shall accede, the whole or any part of the value of work contained in the Provisional Bills of Quantities mentioned in clause 3 hereof shall be deducted from the Contract Sum, and the work of like nature actually executed shall be measured by the D.R., valued by the D.R. as later herein described and the value added to the Contract Sum. Further the D.R. shall have the right, by varying the Specification and Drawings to increase or decrease the quantities of any item or items or to omit any item or items, or to insert any additional item or items without the consent of the Contractor, provided that the total Contract Sum is not thereby, and taking into account the variation of work included in the Provisional Bills of Quantities, increased or decreased in value more than twenty-five per cent. All variations authorized by the D.R. or subsequently sanctioned by him in writing shall be measured and valued by the D.R. who shall give to the Contractor an opportunity of being present at the time of such measurement and of taking such notes and measurements as the Contractor may require. The Contractor shall be supplied with a copy of the measured Bills of Variations not later than the end of the "Period of Final Measurement" stated in the Appendix to these Conditions and before the date of the D.R.'s certificate in respect of such Variations and the valuation thereof unless previously or otherwise agreed shall be made in accordance with the following rules:—

(*a*) The rates in the Provisional Bills of Quantities (if any) mentioned in clause 3 of these Conditions, or if there are no such provisional Bills of Quantities, or the items therein do not relate to the work measured, the rates in the Contractor's estimate mentioned in clause 3 hereof shall determine the valuation of extra work of similar character executed under similar conditions as work priced therein.

(*b*) The said rates, where extra works are not of a similar character or executed under similar conditions as aforesaid, shall be the basis of prices for the same so far as may be reasonable; failing which, a fair valuation thereof shall be made.

(*c*) When extra work cannot properly be measured and valued the Contractor shall be allowed day-work prices. "Day-work prices" for the purpose of this contract shall mean: in the case of labour, the authorized rates paid in accordance with clause 7 with the addition of 15 per cent to cover the cost of plant, scaffolding and tools, supervision, overhead expenses and the Contractor's profit; in the case of materials and transport, prime cost as referred to in clause 21 with addition of 12½ per cent to cover the cost of overhead expenses and Contractor's profit, Provided that vouchers specifying the time daily spent upon the works (and if required by the D.R. the workmen's names) and the material employed shall be delivered for verification to the D.R. or his authorized representatives not later than the end of the week following that in which the work has been executed and if so directed the Contractor shall produce his receipted bills, etc., and wage books in support thereof.

(*d*) The rates in the above mentioned Provisional Bills of Quantities (if any) mentioned in clause 3 of these Conditions or if there are no such Provisional Bills of Quantities or the items therein do not relate to the omitted work, the rates in the Contractor's estimate mentioned in clause 3 of these Conditions shall determine the valuation of items omitted.

Provided that if omissions vary the conditions under which any remaining items of work are carried out, the prices for such remaining items shall be valued under (*b*) hereof.

The measurements and valuation of the works shall be completed within the "Period of Final Measurement" stated in the Appendix or if no other period is so stated then within three months from the completion of the works and effect shall be given to the measurement and valuation of variations by adjustment of the Contract Sum. Interim measurements and valuations shall be made whenever necessary to enable the D.R. to issue certificates under clause 29 hereof.

Bills of Quantities not generally part of Contract.

14. Excepting only the Provisional Bills of Quantities mentioned in clause 3 of these Conditions, any Bills of Quantities or other statements as to quantities of work supplied to the Contractor shall not be deemed to form any part of this Contract nor in anywise influence the validity, construction or effect of this Contract and the rates inserted by the Contractor in the said Contractor's estimate shall continue to be applicable for the purpose of clause 13 of these Conditions, notwithstanding any departure

from such Bills of Quantities or other statements excepting only the Provisional Bills of Quantities mentioned in clause 3 of these Conditions. The quality and quantity of the work included in the Contract Sums shall be deemed to be that which is shown upon the Contract Drawings or described in the Specification, including the Provisional Bills of Quantities (if any) mentioned in clause 3 of these Conditions, but save as aforesaid nothing contained in the said Contract Drawings or Specification, including the said Provisional Bills of Quantities, shall override, modify or affect in any way whatsoever the application or interpretation of that which is contained in these Conditions.

Measures.

15. All dimensions and measures, etc. shown on the drawings and given in the Bills of Quantities shall be taken to be Metric Units of Measurement.

Method of measurement.

16. The Provisional Bills of Quantities, (if any) mentioned in clause 3 of these Conditions shall be deemed to have been prepared in accordance with the principles laid down in the Standard Method of Measurement of Building Works for East Africa (Metric) last before issued, a copy of which may be seen by appointment at the office of the Chief Quantity Surveyor, Ministry of Works, Head Office, Ngong Road, Nairobi. Any variation from the Standard Method of Measurement shall be noted in such Bills of Quantities. The Contractor is advised to examine this document and to take its provisions into account in making up the prices of the items in the Provisional Bills of Quantities, if any, upon which any part of his tender is based. No claim for extra payment based upon alleged ignorance of the method of measurement will be allowed.

Unfixed materials when taken into account to be the property of the Government.

17. Where in any certificate of which the Contractor has received payment the D.R. has included the value of any unfixed materials intended for and placed on or adjacent to the works, such materials shall become the property of the Government and shall not be removed except for use upon the works unless the D.R. has authorized such removal in writing and the Contractor shall be liable for any loss of or damage to the same.

Defects after completion.

18. Any defects, shrinkage or other faults which shall appear within the "Defects Liability Period" stated in Appendix to these Conditions and shall be due to materials or workmanship not in accordance with this Contract or to other causes occurring before the completion of the works shall within a reasonable time after receipt of the D.R.'s written instructions in that behalf be made good by the Contractor and (unless the D.R. shall otherwise direct in writing) at his own cost.

Assignment or subletting.

19. The Contractor shall not without the written consent of the D.R. assign this Contract or sublet any portion of the works; provided that such consent shall not be unreasonably withheld to the prejudice of the Contractor.

Nominated sub-contractors.

20. The following provisions of this Condition shall apply where prime cost sums are included in the Specification or arise as a result of D.R.'s instructions given in regard to the expenditure of provisional sums in respect of persons to be nominated by the D.R. to supply and fix materials or goods or to execute work:—

(*a*) Such sums shall be understood to mean the net cost after deducting any trade or other discount and shall be expended in favour of such persons as the D.R. shall instruct and all specialists or others who are nominated by the D.R. are hereby declared to be sub-contractors employed by the Contractor and are referred to in these Conditions as "nominated sub-contractors". Provided that the D.R. shall not nominate any person as a sub-contractor against whom the Contractor shall make reasonable objection, or (save where the D.R. and Contractor shall otherwise agree) who will not enter into a sub-contract which provides (*inter alia*):

(i) That the nominated sub-contractor shall carry out and complete the sub-contract works in every respect to the reasonable satisfaction of the Contractor and of the D.R. and in conformity with all the reasonable directions and requirements of the Contractor.

(ii) That the nominated sub-contractor shall observe, perform and comply with all the provisions of this Contract on the part of the Contractor to be observed, performed and complied with (other than clause 23 of these Conditions, if applicable) so far as they relate and apply to the Sub-contract works or to any portion of the same.

(iii) That the nominated sub-contractor shall indemnify the Contractor against the same liabilities in respect of the sub-contract works as those for which the Contractor is liable to indemnify the Government under this Contract.

(iv) That the nominated sub-contractor shall indemnify the Contractor against claims in respect of any negligence, omission or default of such sub-contractor, his servants or agents or any misuse by him or them of any scaffolding or other plant, and shall insure himself against any such claims and produce the policy or policies and receipts in respect of premiums paid as and when required by either the D.R. or the Contractor.

(v) That the sub-contract works shall be completed within the period or (where they are to be completed in sections) periods therein specified, that the Contractor shall not without the written consent of the D.R. grant any extension of time for the completion of the sub-contract works or any section thereof, and that the Contractor shall inform the D.R. of any representation made by the nominated sub-contractor as to the cause of any delay in the progress or completion of the sub-contract works or of any section thereof.

(vi) That if the nominated sub-contractor shall fail to complete the sub-contract works or (where the sub-contract works are to be completed in sections) any section thereof within the period therein specified or within any extended time granted by the Contractor with the written consent of the D.R. and the D.R. certifies in writing to the Contractor that the same ought reasonably so to have been completed, the nominated sub-contractor shall pay or allow to the Contractor either a sum calculated at the rate therein agreed as liquidated and ascertained damages for the period during which the said works or any section thereof, as the case may be, shall so remain or have remained incomplete or (where no such rate is therein agreed) a sum equivalent to any loss or damage suffered or incurred by the Contractor and caused by the failure of the nominated sub-contractor as aforesaid.

(vii) That payment in respect of any work, materials or goods comprised in the sub-contract shall be made within 14 days after receipt by the Contractor of the D.R.'s certificate under clause 29 of these Conditions which states as due an amount calculated by including the total value of such work, materials or goods and shall when due be subject to the retention by the Contractor of the sums mentioned in sub-paragraph (viii) of paragraph (*a*) of this Condition.

(viii) That the Contractor shall retain from the sum directed by the D.R. as having been included in the calculation of the amount stated as due in any certificate issued under clause 29 of these Conditions in respect of the total value of work, materials or goods executed or supplied by the nominated sub-contractor, the percentage of such value named in the appendix to these Conditions as Percentage of Certified Value Retained up to a total amount not exceeding a sum which bears the same ratio to the sub-contract price as the unreduced sum named in the appendix to these Conditions as Limit of Retention Fund bears to the Contract Sum; and that the Contractor's interest in any sums so retained (by whomsoever held) shall be fiduciary as trustee for the nominated sub-contractor (but without obligation to invest); and that the nominated sub-contractor's beneficial interest in such sums shall be subject only to the right of the Contractor to have recourse thereto from time to time for payment of any amount which he is entitled under the sub-contract to deduct from any sum due or to become due to the nominated sub-contractor; and that if and when such sums, or any part thereof are released to the nominated sub-contractor they shall be paid in full.

(ix) That the D.R. and his representative shall have a right of access to the workshops and other places of the nominated sub-contractor as mentioned in clause 11 of these Conditions.

(*b*) The D.R. shall direct the Contractor as to the total value of the work, materials or goods executed or supplied by a nominated sub-contractor included in the calculation of the amount stated as due in any certificate issued under clause 29 of these Conditions and shall forthwith inform the nominated sub-contractor in writing of the amount of the said total value. The sum representing such total value shall be paid by the Contractor to the nominated sub-contractor within 14 days of receiving from the D.R. the certificate less only (i) any retention money which the Contractor may be entitled to deduct under the terms of the sub-contract and (ii) any sum to which the Contractor may be entitled in respect of delay in the completion of the sub-contract works or any section thereof.

(*c*) Before issuing any certificate under clause 29 of these Conditions the D.R. may request the Contractor to furnish to him reasonable proof that all amounts included in the calculation of the amount stated as due in previous certificates in respect of the total value of the work, materials or goods executed or supplied by any nominated sub-contractor have been duly discharged, and if the Contractor fails to comply with any such request the D.R. shall issue a certificate to that effect and thereupon the Government may itself pay such amounts to any nominated sub-contractor concerned and deduct the same from any sums due or to become due to the Contractor.

(*d*) (i) The Contractor shall not grant to any nominated sub-contractor any extension of the period within which the sub-contract works or (where the sub-contract works are to be completed in sections) any section thereof is to be completed without the written consent of the D.R., provided always that the Contractor shall inform the D.R. of any representations made by the nominated sub-contractor as to the cause of any delay in the progress or completion of the sub contract works or of any section thereof and that the consent of the D.R. shall not be unreasonably withheld.

(ii) If any nominated sub-contractor fails to complete the sub-contract works or (where the sub-contract works are to be completed in sections) any section thereof within the period specified in the sub-contract or within any extended time granted by the Contractor with the written consent of the D.R. then if the same ought reasonably so to have been completed the D.R. shall certify in writing accordingly; immediately upon issue the D.R. shall send a duplicate of any such certificate to the nominated sub-contractor.

(*e*) If the D.R. desires to secure final payment to any nominated sub-contractor before final payment is due to the Contractor, and if such sub-contractor has satisfactorily indemnified the Contractor against any latent defects then the D.R. may in an Interim Certificate include an amount to cover the said final payment and thereupon the Contractor shall pay to such nominated sub-contractor the amount so certified. Upon such final payment, the amount named in the appendix to these Conditions as Limit of Retention Fund shall be reduced by the sum which bears the same ratio to the said amount as does such sub-contractor's sub-contract price to the Contract Sum and save for latent defects the Contractor shall be discharged from all liability for the work, materials or goods executed or supplied by such sub-contractor under the sub-contract to which the payment relates.

(*f*) Neither the existence nor the exercise of the foregoing powers nor anything else contained in these conditions shall render the Government in any way liable to any nominated sub-contractor.

(*g*) Where the Contractor in the ordinary course of his business directly carries out works for which prime cost sums are included in the Specification and where items of such works are set out in the Appendix to these Conditions or he has so informed the D.R. and the D.R. is prepared to receive tenders from the Contractor for such items, then the Contractor shall be permitted to tender for the same or any of them but without prejudice to the Government's right to reject the lowest or any tender. If the Contractor's tender is accepted, he shall not sub-let the work without the consent of the D.R.

(*h*) Where the terms of a contract between the Contractor and a nominated sub-contractor so require or the D.R. shall so authorize in writing the Contractor shall make advance payments to the sub-contractor before delivery of the goods, and the Contractor shall be allowed interest for the period from the date of such advance payment on the value of such goods calculated at the rate of 1% per month until the value of the said goods is included in a certificate in accordance with clause 29.

(i) The Contractor shall enter into sub-contracts with the nominated sub-contractor adopting for this purpose the latest edition of the Agreement and Schedule of Conditions of Building Sub-Contract published by the Kenya Association of Building and Civil Engineering Contractors with the

sanction of the East Africa Institute of Architects, but with the following amendments incorporated therein:—

(i) *Clause* 11. Delete the words "the Agreement and Schedule of Conditions of Building Contract currently published by the East Africa Institute of Architects" and insert the words "Clause 15 of the Conditions of Contract contained in the Ministry of Works Contract Agreement (1970 Edition)".

(ii) *Clause* 25. Add at the end of the first paragraph the words: "The Sub-Contractor shall be responsible for and pay the cost of any further scaffolding he may require."

(*j*) Any sums due to any nominated sub-contractor may upon the certification of the D.R. at his absolute discretion be paid direct by the Government to that sub-contractor and not paid through the agency of the Contractor.

(*k*) The Contractor shall allow all nominated sub-contractors every facility for carrying out their work and shall provide attendance comprising allowing use of standing scaffolding, messrooms, sanitary accommodation and welfare facilities, unloading, providing space and facilities for storage and office accommodation, hoisting, providing water light and power, removing and replacing duct covers, pipe casings and the like necessary for the execution and testing of sub-contractors' work and clearing away rubbish. The Contractor shall further provide templates, dimensions and supervision for the proper carrying out of the sub-contractor's work and shall be responsible for the accuracy of the same.

(*l*) The Contractor shall insert under the various prime cost sums included in the Specification such percentage additions as he may require to cover his overheads and profit and such lump sums as he may require to cover the attendances upon the nominated sub-contractors referred to above. Such percentage additions in respect of overheads and profit shall be deducted from the Contract Sum and in lieu thereof the Contractor shall be paid the said percentages of the actual amounts directed to be expended in respect of the relevant prime cost sums. Lump Sums for attendance shall be adjusted pro rata to the physical extent of the work executed.

Nominated suppliers.

21. The following provisions of this Condition shall apply where prime cost sums are included in the Specification or arise as a result of D.R.'s Instructions given in regard to the expenditure of provisional sums, in respect of any materials or goods to be fixed by the Contractor.

(*a*) Such sums and the term prime cost when included or arising as aforesaid, shall be understood to mean the net cost to be defrayed as a prime cost after deducting any trade or other discount and shall include customs duty or other tax, and the cost of packing carriage and delivery. Provided that, where in the opinion of the D.R. the Contractor has incurred expense for special packing or special carriage, such special expense shall be allowed as part of the sums actually paid by the Contractor.

(*b*) Such sums shall be expended in favour of such persons as the D.R. shall instruct, and all specialists, merchants, tradesmen or others who are so nominated by the D.R. to supply materials, or goods are hereby declare to be suppliers to the Contractor and are referred to in these Conditions as 'nominated suppliers'. Provided that the D.R. shall not (save where the D.R. and Contractor shall otherwise agree) nominate as a supplier a person who will not enter into a contract of sale which provides (*inter alia*):

(i) That the materials or goods to be supplied shall be to the reasonable satisfaction of the D.R.

(ii) That the nominated supplier shall make good by replacement or otherwise any defects in the materials or goods supplied which appear within such period as is therein mentioned and shall bear any expenses reasonably incurred by the Contractor as a direct consequence of such defects, provided that:—

(1) where the materials or goods have been used or fixed such defects are not such that examination by the Contractor ought to have revealed them before using or fixing and

(2) such defects are due solely to defective workmanship or material in the goods supplied and shall not have been caused by improper storage by the Contractor or by misuse or by any act or neglect of either the Contractor, the D.R. or the Government or by any person or persons for whom they may be responsible.

(iii) That delivery of the materials or goods supplied shall be commenced and completed at such times as the Contractor may reasonably direct.

(*c*) All payments by the Contractor for materials or goods supplied by a nominated supplier shall be in full and shall be paid within 30 days of the end of the month during which delivery is made.

(*d*) Where the terms of a contract between the Contractor and a nominated supplier so require or the D.R. shall so authorize in writing the Contractor shall make advance payments to the supplier before delivery of the goods, and the Contractor shall be allowed interest for the period from the date of such advance payment on the value of such goods calculated at the rate of ½% per month until the value of the said goods is included in a certificate in accordance with clause 29.

(*e*) The Contractor shall insert percentage additions as described in clause 20 hereof to cover his overheads and profit on prime cost sums.

Injury to persons and property.

22. (*a*) *Injury to Persons.*—The Contractor shall be liable for and shall indemnify the Government against and shall insure himself against any liability, loss claim or proceedings, whatsoever arising under any statute or at common law in respect of personal injury to or the death of any person whomsoever (whether an employee of the Contractor or of the Government or otherwise) arising out of or in the course of or caused by the execution of the works, unless due to any act or neglect of the Government or of any person for whom the Government is responsible.

(*b*) *Injury to Property.*—The Contractor shall be liable for, and shall indemnify the Government against, and shall insure himself against any liability, loss claim or proceedings in respect of any injury or damage whatsoever to any property movable or immovable in so far as such injury or damage arises out of or in the course of or by reason of the execution of the works, and provided always that the same is due to any negligence, omission, wilful act or default of the Contractor, his servants or agents or of any sub-contractor or to any circumstances within the Contractor's control; and subject also as regards loss or damage by fire to the provisions contained in clause 23 of these Conditions.

Insurance.

23. The Contractor shall in the joint names of Government and the Contractor insure against loss and damage by fire, lightning and earthquake and fire following earthquake, storm, tempest, flood, aircraft or anything dropped therefrom and aerial objects for the full value thereof all work executed and materials and goods upon the site including any unfixed materials or goods which by virtue of clause 29 of these Conditions have become the property of the Government and shall keep such work, materials and goods so insured until the works are delivered up; such insurance shall be with a company or companies approved by the D.R. and the Contractor shall deposit with him the policies and premium receipts; should the Contractor make default the Government may insure as aforesaid and deduct the premiums paid from any moneys due or to become due to the Contractor.

The contractor shall upon settlement of any claim under the policies aforesaid proceed with due diligence to rebuild or repair the works and replace or repair the materials or goods destroyed or injured. All moneys received under such policies are to be paid to the Contractor by instalments under certificates of the D.R. and the Contractor shall not be entitled to any payment in respect of the rebuilding or repair of the works or the replacement or repair of the materials or goods destroyed or injured other than the moneys received under the said policies.

Date for possession and completion.

24. On or before the "Date for Possession" stated in the Appendix to these Conditions possession of the site shall be given to the Contractor who shall thereupon begin the works forthwith and regularly and diligently proceed with the same and shall complete the same on or before the "Date for Completion" stated in the said Appendix subject nevertheless to the provisions for extension of time contained in clause 26 of these Conditions.

Damages for non-completion.

25. If the Contractor fails to complete the works by the date stated in the Appendix to these Conditions or within any extended time fixed under clause 26 of these Conditions and the D.R. certifies in writing that in his opinion the same ought reasonably so to have been completed, the Contractor shall pay or allow to the Government a sum calculated at the rate stated in the said Appendix as "Liquidated and Ascertained Damages" for the period during which the said works shall so remain or have remained incomplete, and the Government may deduct such damages from any moneys otherwise payable to the Contractor under this Contract.

Delay and extension of time.

26. If in the opinion of the D.R. the works be delayed:—

(i) by force majeure; or

(ii) by reason of any exceptionally inclement weather; or

(iii) by reason of such loss or damage by fire as is referred to in clause 23 of these Conditions; or

(iv) by reason of civil commotion, local combination of workmen, strike or lockout affecting any of the trades employed upon the works; or

(v) by reason of D.R.'s Instructions for variation or postponement given in pursuance of clause 2 of these Conditions; or

(vi) because the Contractor has not received in due time necessary instructions from the D.R. for which he shall have specifically applied in writing; or

(vii) by delay on the part of other contractors or tradesmen engaged by the Government in executing work not forming part of this Contract,

then in any such case the D.R. shall make a fair and reasonable extension of time for completion of the works. Upon the happening of any such event causing delay the Contractor shall immediately give notice thereof in writing to the D.R., but he shall nevertheless use constantly his best endeavours to prevent delay and shall do all that may reasonably be required to the satisfaction of the D.R. to proceed with the works.

Determination of contract.

27. (*a*) *Default.*—If the Contractor shall make default in any of the following respects, viz.—

(i) if without reasonable cause he wholly suspends the works before completion;

(ii) if he fails to proceed with the works with reasonable diligence;

(iii) if he refuses or persistently neglects to comply with a notice in writing from the D.R. requiring him to remove defective work or improper materials and by such refusal or neglect the works are in the opinion of the D.R. materially affected,

and if he shall continue such default for seven after a notice by registered post specifying the default has been given by the D.R., the Government may without prejudice to any other rights or remedies, thereupon by notice by registered post determine the employment of the Contractor under this Contract.

Provided that notice in pursuance of this clause shall not be given unreasonably or vexatiously and shall be void if the Government is at the time of the notice in breach of this Contract.

(*b*) *Bankruptcy of Contractor.*—If the Contractor commits an act of bankruptcy or being a company enters into liquidation whether compulsory or voluntary except liquidation for the purposes of reconstruction the Government may, without prejudice to any other rights or remedies, by notice by registered post determine the employment of the Contractor under this Contract.

(*c*) *Wrongful Assignment.*—If the Contractor assigns or purports or attempts to assign this Contract or any benefit hereunder, or sublets or purports or attempts to sublet any of the works, contrary to clause 19 hereof, the Government may without prejudice to any other rights or remedies by notice by registered post determine the employment of the Contractor under this Contract.

(*d*) In any of the cases for which the three preceeding sub-clauses provide the following shall be the respective rights and duties of the Government and Contractor, viz.—

(i) The Government may complete the works departmentally or may employ and pay another contractor or other person or persons to carry out and complete the works and he or they may enter upon the site and use all temporary buildings, plant, machinery, appliances, goods and materials thereon, and may purchase all materials necessary for the carrying out and completion of the works.

(ii) Should the Government complete the works departmentally the amount of expenses properly incurred by the Government referred to in clause 27 (*v*) below shall include an allowance to cover the cost of supervision, interest and depreciation on plant and all other usual charges and profit as would have been incurred had the work been carried out by another contractor.

(iii) The Contractor shall, if so required by the Government or the D.R., assign to the Government without further payment the benefit of any agreement for the supply of materials and/or for the execution of any works for the purposes of this Contract and the Government shall pay for any such materials or works supplied or executed under such agreement, after the said determination, the price fixed by such agreement in so far as it has not been already paid by the Contractor.

(iv) The Contractor shall during the execution or after the completion of the works under this clause remove from the site as and when required, within such reasonable time as the D.R. may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to or hired by him, and in default the Government may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.

(v) Until after completion of the work under this clause the Government shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefor the D.R. shall certify the amount of expenses properly incurred by the Government and, if such amount added to the moneys paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract the difference shall be a debt payable to the Government by the Contractor; and if the said amount added to the said moneys be less than the said total amount, the difference shall be a debt payable by the Government to the Contractor.

Artists and tradesmen.

28. The Contractor shall permit the execution of work not provided for in the Specification by artists, tradesmen or others engaged by the Government. Every such person shall for the purposes of clause 22 of these Conditions be deemed to be a person for whom the Government is responsible and not to be a sub-contractor.

Certificates and payments.

29. (*a*) At the "Period of Interim Certificates" named in the Appendix, the Contractor shall be entitled to a certificate from the D.R. of the amount due to him from the Government and after issue thereof to payment therefor upon presentation within the period named in the Appendix.

(*b*) The amount so due as aforesaid shall be the total value of the work duly executed and of the materials and goods delivered upon the site for use in the works up to and including a date not more than seven days prior to the date of the said certificate less the amount to be retained by the Government (as hereinafter provided) and less any instalments previously paid under this clause:

Provided that such certificate shall only include the value of the said materials and goods as and from such time as they are reasonably and not prematurely brought upon the site and then only if adequately stored and/or protected against weather or other casualties.

(*c*) The amounts to be retained as aforesaid shall be such percentage of the value of the work and materials as aforesaid as is named in the Appendix as "Percentage of Certified Value Retained" and up to the amount named in the Appendix as "Limit of Retention Fund" (which in neither case shall exceed 10 per cent of the Contract Sum) and upon reaching such limit or such reduced sum as provided by clause 20 of these Conditions and thereafter the full value of work and materials as aforesaid shall be certified by the D.R.

(*d*) The Contractor shall (subject to clause 25 hereof) be entitled to a certificate for one moiety of the Retention Fund upon practical completion of the works.

(*e*) Upon expiration of the "Defects Liability Period" stated in the Appendix or if no period stated then within six months after completion of the works or upon completion of making good defects under clause 18 hereof, whichever is later, the D.R. shall issue a final certificate of the value of the works executed by the Contractor and such final certificate save in cases of fraud, dishonesty of fraudulent concealment relating to the works or materials or to any matter dealt with in the certificate and save as regards all defects and insufficiencies in the works or materials which a reasonable examination would not have disclosed shall be conclusive evidence as to the sufficiency of the said works and materials and of the value thereof.

(*f*) No certificate of the D.R. shall of itself be considered conclusive evidence as to the sufficiency of any work or materials to which it relates so as to relieve the Contractor from his liability to execute the works in all respects in accordance with the terms and upon and subject to the conditions of this Agreement or from his liability to make good all defects as provided thereby.

Fluctuations.

30. The Contract Sum shall be deemed to have been calculated to include all duties on materials to be used in the works. If at any time during the period of the contract the duties shall be varied and in the opinion of the D.R. this shall affect the cost to the Contractor of such materials, then the D.R. shall ascertain the net difference in cost of such materials. Any amount from time to time so ascertained shall be added to or deducted from the contract sum as the case may be. In the purposes of this clause "duties" shall include all customs and excise charges, tariffs, taxes and other duties imposed by statutory or other authority in the country where the works are being carried out.

Bond.

31. The Contractor is required to find and to submit on the Form of Tender, the name of One Surety who shall be an established Bank, Insurance Company or Fidelity Guarantee Corporation and who will be willing to be bound to the Government of Kenya in an amount equal to Seven and a Half per cent (7½%) of the Contract Amount for the due performance of the Contract up to the date of completion as certified by the D.R. and who will, when and if called upon sign a Bond to that effect on M.O.W. Form 118 (without the addition of any limitations) on the same day as the Contract Agreement is signed. In the event of the Surety named in the Form of Tender not being approved by the Government the Contractor shall furnish within seven days another Surety to the approval of the Government.

Arbitration

32. Provided always that in case any dispute or difference shall arise between the Government or the D.R. on behalf of the Government and the Contractor, either during the progress or after the completion or abandonment of the works, as to the construction of this Contract or as to any matter or thing of whatsoever nature arising thereunder or in connexion therewith, including any matter or thing left by this Contract to the discretion of the D.R. or the withholding by the D.R. of any certificate to which the Contractor may claim to be entitled or the measurement and valuation mentioned in clause 13 of these Conditions or the rights and liabilities of the parties under clause 27 of these Conditions, then either party shall forthwith give to the other notice in writing of such dispute or difference, and such dispute or

difference shall be and is hereby referred to the arbitration and final decision of such person or persons as the parties may by agreement appoint to act between them or failing agreement then to the arbitration and final decision of a sole arbitrator to be appointed by the President or Vice-President of the Architectural Association of Kenya, for the time being, and the award of such arbitrator shall be final and binding on the parties. Such reference, except on clause 5 or clause 8 of the foregoing Conditions, or on the question whether or not a certificate has been improperly withheld, shall not be opened until after the completion or alleged completion or abandonment of the works, unless with the written consent of the Government or the D.R. and the Contractor. Without prejudice to the generality of his powers the arbitrator shall have power to direct such measurements and/or valuations as may in his opinion be desirable in order to determine the rights of the parties and to ascertain and award any sum which ought to have been the subject of or included in any certificate and to open up, review and revise any certificate, opinion, decision, requisition or notice and to determine all matters in dispute which shall be submitted to him and of which notice shall have been given as aforesaid in the same manner as if no such certificate, opinion, decision, requisition or notice had been given.

Saving clause.

33. If any clause, stipulation or provision contained in any Contract Document shall be wholly or partially repeated in the same document or contained in these Conditions or in the Contract Agreement and also in the Specification or on the Drawings, the D.R. may at his option, adopt either of such clauses, stipulations or provisions.

Notices.

34. For notices to be served hereunder:—

(i) the Contractor shall notify the D.R. an address whereat notices may be served upon him, or in the event of his failing to do so;

(ii) notices shall be deemed served upon the Contractor if sent by registered post to his usual place of business or left at his offices on the works.

Sectional completion.

35. If the Government shall take over any part or parts of the works as stated in the Specification (each such part being hereinafter in this clause referred to as "the relevant part") then notwithstanding anything expressed or implied elsewhere in this contract,

(*a*) within seven days from the date on which the Government shall have taken possession of the relevant part the D.R. shall issue a certificate stating his estimate of the approximate total value of the said part, and for all purposes of this Condition (but for no other) the value so stated shall be deemed to be the total value of the said part.

(*b*) For the purposes of sub-paragraph (ii) of paragraph (*f*) of this Condition and of clause 18 of these Conditions, practical completion of the relevant part shall be deemed to have occurred and the Defects Liability Period in respect of the relevant part shall be deemed to have commenced on the date on which the Government shall have taken possession thereof

(*c*) When in the opinion of the D.R. any defects, shrinkages or other faults in the relevant part which he may have required to be made good under clause 18 of these Conditions shall have been made good he shall issue a certificate to that effect.

(*d*) The Contractor shall reduce the value insured under clause 23 of these Conditions (if applicable) by the full value of the relevant part, and the said relevant part shall as from the date on which the Government shall have taken possession thereof be at the sole risk of the Government as regards any of the contingencies referred to in the said clause.

(*e*) In lieu of any sum to be paid or allowed by the Contractor under clause 25 of these Conditions in respect of any period during which the works may remain incomplete occurring after the date on which the Government shall have taken possession of the relevant part there shall be paid or allowed such sum as bears the same ratio to the sum which would be paid or allowed apart from the provisions of this Condition as does the Contract Sum less the total value of the said relevant part to the Contract Sum.

(*f*) (i) Within twenty-eight days of the date on which the Government shall have taken possession of the relevant part there shall be paid to the Contractor from the sums then retained under clause 29 (*c*) of these Conditions (if any) one moiety of such amount as bears the same ratio to the unreduced amount named in the Appendix to these Conditions as Limit of Retention Fund as does the total value of the said relevant part to the Contract Sum, and the amount named in the Appendix to these Conditions as Limit of Retention Fund shall be reduced by the amount of such moiety.

(ii) On the expiration of the Defects Liability Period named in the Appendix to these Conditions in respect of the relevant part or upon completion of making good defects under clause 18 hereof in respect of the relevant part, whichever is the later, there shall be paid to the Contractor from the sums then retained under clause 29 (*c*) of these Conditions (if any) the other moiety of the amount referred to in the immediately preceding sub-paragraph, and the amount named in the Appendix to these Conditions as Limit of Retention Fund shall be reduced by the amount of such moiety.

Corrupt gifts and payments of commission.

36 The Contractor shall not:—

(*a*) Offer or give or agree to give to any person in the service of the Government any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for the Government or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract for the Government.

(*b*) enter into this or any other contract with the Government in connexion with which commission has been paid or agreed to be paid by him or on his behalf or to his knowledge, unless before the contract is made particulars of any such commission and of the terms and conditions of any agreement for the payment thereof have been disclosed in writing to the Government

Any breach of this Condition by the Contractor or by anyone employed by him or acting on his behalf (whether with or without the knowledge of the Contractor) or the commission of any offence by the contractor or by anyone employed by him or acting on his behalf under any section of the Laws of Kenya which deals with the prevention of corruption, in relation to this or any other contract for the Government, shall entitle the Government to determine the contract (in which case the rights and duties of the parties to the Contract shall be those stated in clause 27 sub-clause (*d*) hereof), and to recover from the Contractor the amount or value of any such gift, consideration or commission.

APPENDIX

	Clause	
Period of Final Measurement (if none other state is three months from the practical completion of the Works)	13	....
Defects Liability Period (if none other stated is six months from the practical completion of the Works)	18 and 29 (*e*)	.....
		....
Date for Possession	24	.....
Date for Completion	24	.....
		.....
		.....
		....
Liquidated and Ascertained Damages ...	25	at the rate of Sh. .....
		.....
		.....
		.....
		per .....
Prime Cost or Provisional Sums for which the Contractor desires to tender	20 (*g*)	.....
		.....
		.....
Period of Interim Certificates	29 (*a*)	.....
Period of Honouring Certificates	29 (*a*)	.....
Percentage of Certified Value Retained (not to exceed 10 per cent)	29 (*c*)	.....
Limit of Retention Fund (not to exceed 10 per cent)	29 (*c*)	.....

GPK 2191—1m—7/70

REPUBLIC OF KENYA

The House Holder/Officer-in-Charge

.....

MINISTRY OF WORKS, HOUSING AND
PHYSICAL PLANNING
PROVINCIAL WORKS OFFICER,
P.O. Box 42267
NAIROBI

Date .....

WORK INSTRUCTIONS

Building No. .....

The bearer is sent to carry out the following: .....

.....

On completion of the work kindly sign in the space below and return to the bearer.

Work completed—Date ..... Signature .....

House Holder/Officer-in-Charge

Note.—It is requested that the workmen will not be asked to do any other work other than that stated above.

For .....

Depot Works Officer.

Authorizing Work Instructions

Work completed

.....

Supervisor-in-Charge

GPK 1643—20m—11/81

MINISTRY OF WORKS AND HOUSING M.O.W. 458

Depot.....

DAILY COST SHEET

Date .....

W.I. No.	Man's No.	Hrs.	Rate	Value	Total Wages	Total Wages B/F	Total Wages to Date	Staff Wages	Staff Wages B/F	Total Staff Wages to Date	P.S.R. No.	Value	Material Cost B/F	Total Material Cost	Remarks

M.O.W. 361B

MAINTENANCE RECORD (FOR DIVISIONAL USE ONLY)			
DESCRIPTION		REGISTER NUMBER	
OIL PAINT EXTERNAL	SQ. FT.	WATER PAINT EXTERNAL	SQ. FT.
OIL PAINT INTERNAL	SQ. FT.	WATER PAINT INTERNAL	SQ. FT.

MAINTENANCE

DATE	PARTICULARS	COST	DATE	PARTICULARS	COST

QUESTIONNAIRE APPENDIX V

MAINTENANCE MANAGEMENT

1. What is your organization structure?.....
2. How many depots fall under your management?.....
3. State either or both:
   (a) the number of buildings or their values under each depot.....
   (b) breakdown of personnel in each depot.....
4. State the nature of training offered to the various cadres of your staff .....
5. What do you define as maintenance work?.....
6. Do you have any classifications of maintenance work? Yes/No. If Yes, what are they?.....
7. How do these classifications assist you in planning your maintenance work?.....
8. Define the communication network in your organization?.....
9. How is your maintenance work funded?.....
10. State the amount of funds required and funds approved since the year 1975/76.....
11. What methods do you use in executing maintenance work?
    (a) direct labour
    (b) contract labour
    (c) direct labour and contract labour.
12. If the answer is (c) how do you apportion work between the two?.....

13. Which types of contracts do you employ and what are their advantages and/or disadvantages?.....

14. Which methods of tendering do you employ and why?.....

15. How do you select your contractors for tendering? .....

16. How do you determine the appropriate contractor after submission of tenders?.....

17. State how such contracts are funded.....

18. State how work is executed by the contractor to completion.....

19. State the number of contracts awarded each year from 1975/76.....

20. How many contracts were completed in time in each year?.....

21. What were the time overruns for those not completed in time?.....

22. How do you identify minor maintenance defects?.....

23. Describe the procedure for executing such works.....

24. How many minor maintenance reports have you received by depot and by trade each year since 1975/76?

25. How many of such reports were successfully attended to?.....

26. If all reports were not attended to, what reasons do you advance?.....

27. State the financial standing at the end of each financial year since 1975/76.....

28. How do you compare the performance of direct labour and contract labour?.....

29. How do you measure the performance of the department/province as a unit?.....

30. Is your performance satisfactory? Yes/No.....

31. If "No" what recommendations do you propose to improve on the performance.

USER REACTION/PHYSICAL SURVEY

32. Name of Estate/office Block/Institution.....

33. State the defects in the building.

(a) .....

(b) .....

(c) ..... etc.

34. Have you reported these defects? Yes/No.....

35. If "No", why?.....

36. If yes, when did you report each of them?.....

37. Has any inspection been carried out since you reported the defects? Yes/No.....

38. If "Yes" when was the inspection carried out?

.....

39. Have you found out why the work has not been done? YES/NO.....

40. If "Yes" what reasons have been advanced?.....

41. Have any inspections and/or repairs been carried?

42. In your opinion how would you rate the maintenance department in terms of response to your requests:

(a) very good

(b) good

(c) poor

(d) very poor.

43. In your opinion how would you rate the department's artizans in terms of workmanship?

(a) very good

(b) good

(c) poor

(d) very poor