

**THE COMPUTER APPLICATION TO REAL PROPERTY  
APPRAISAL, DEVELOPMENT AND MANAGEMENT.  
(A CASE STUDY OF COMMERCIAL PROPERTY).**

**BY**

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## CERTIFICATION

This is the project work of Olubode Victor in partial fulfillment of the requirements for the award of Post-Graduate Diploma in Computer Science.

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## DEDICATION

To God Almighty, the giver of Wisdom, Knowledge and understanding. To him the glory forever. AMEN.

To my precious wife – Mrs Kehinde Oyebola Olubode: for her support and encouragement



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May God bless you all.



## **ABSTRACT**

In computing the Property Appraisal, development and management, a detailed analysis of the manual method was carried out. This was found to be laborious and time consuming leading to the design of the new computerized system. However, this system had to do with writing a computer program Dbase that accepts inputs directly from keyboard through collection of data from special journals, papers and books written by individuals. This would alleviate if not eradicate the longer processes and other problems faced by property developers and managers.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Real Property Management and The Changing Science

The organisation and management of construction projects has existed in practice since buildings were first constructed. The process long ago was much simple, but then so was life in general. As knowledge increased and societies became more complex, so the principles and procedures involved in management evolved and will continue to do so management of construction works has now emerged as separate and identifiable professional discipline.

Construction project management can be described as the planning, control and co-ordination of a project from concept to completion (including commissioning) on behalf of a client. It is concerned with the identification of the client's objectives in terms of utility, function, quality, time and cost, and the establishment of relationship between resources. "The integration monitoring and control of the contribution to the project and their out put and the evaluation and selection of alternatives in pursuit of the client satisfaction with the project outcome, are fundamental aspects of construction project management."

However, recently, new scientific management concepts have been developed and applied. Application of these principles to construction has resulted in the development of techniques for the management control of

construction cost, time, resources and project finance, treating the entire construction process a unified system.

## 1.2 Aim and Objectives

With the application of computer to Real property Appraisal, Development and Management, the aim and objectives of this project could be summarily put down as follows:

- (a) To examine those aspects of the Real Property Appraisal, Development and Management to which the training and expertise of professionals (Property Developers and Managers) could be of relevance, through the application of computer and a brief study of the necessary management techniques to be applied to the construction industry.
- (b) To explore and provide an understanding of the services that could be offered by the computer as a management tool.
- (c) To highlight the possibilities and the importance of combining the computer with manual effort in achieving the objectives of Real Property Appraisal, Development and Management.
- (d) To look in to some areas of, and stress the need for specific application of computer to aid decision making process.
- (e) To provide and encourage property developers to develop own program, that could satisfy their needs.

### 1.3 Definition of Terms

Real Property Appraisal, development and Management as well as computer application could form a vast field of study bringing in together a number of specialized courses with numerous technical terms. It is therefore considered as not being necessary to confirm to the usual ideal in a work of this nature of regulating the definition of terms used to separate portion.

The method adopted here is to explain new and strange terms which are better understood in the context of the lines in which they appear.

### 1.4 General Approach To The Project

The general approach or methodology adopted for this project is the utilization of information and data obtained from the study of the following sources:

- (a) Textbooks
- (b) Technical and Professional Journals and Magazines
- (c) Project reports
- (d) Discussions
- (e) Lectures for the PGD Computer Science 1997/1998 session

### 1.5 Limitations of the Study

It is not common to carry out a work of this nature without a number of limitations.



When the idea to undertake a project on this topic, Appraisal, Development and Management of Real Property with Computer application came to me it was hoped that only the most up to date material would be presented but it was not totally achieved. There is difficulty in obtaining such up-to-date material, hence a number of recent ones are however used (See BIOBLIOGRAPHY)

## CHAPTER TWO

### GENERAL INFORMATION ON PROPERTY APPRAISAL, DEVELOPMENT AND MANAGEMENT

#### 2.1 Review of Related Literature

So many people have written on property development and management, also so many thesis and journal on it, but the application of computer to it has not been commonly wide-spread.

Mr. Shola Akinwale, AVIS, FNIEV (Fellow, Nigeria Institution of Estate Surveyor and valuer) as delivered in his address during the workshop on Property Development and Management: Plant and Machinery, held at Nigeria Institution of Estate Surveyor and Valuer building, behind former Ikoyi Secretariat on the 4<sup>th</sup> of September 1998 submitted that: "The task of property management and development especially in the area of "plant and machinery" is too cumbersome that it is only qualified professionals that can handle it, but we are of the opinion that with the introduction of computer, the job of Management and Development can easily be handle even by non-professionals with little enlightenment on the use of computer to carry out the work.

Mr. Segun Olawale in his final project in the Year 1997/98 session of the Obafemi Awolowo University, Department of Quantity Surveying, enumerated and discussed at length. The management techniques as particular to project construction only. But the management techniques



are not only related to this area above, but they are tools among many that can be and should be used by all forms, irrespective of size and type of the property.

The management techniques are vital tools that enable decisions to be taken with greater knowledge of the facts, these facts are to be made known in this work, because ignorance of there techniques available to management of property lead to inefficient operation and may eventually lead to bankruptcy in the competitive year ahead. The application of computer as well as the use of scientific methods is essential to effective management.

Furthermore, on page 6 of a quarterly journal. The Portfolio "a bulletin of NIESV, under the tittle – management made easy, published on 14<sup>th</sup> of April 1996, Mr. Tai Alli of Tai Alli & Partners wrote on management, but failed to mention planning and planning is very essential in management.

Infact, good management job cannot be accomplished without "planning". It is the devising of a workable scheme of operation used to accomplish on established objective when put into action. Ir requires an intimate knowledge of construction methods combined with the ability to visualize discrete work events and to establish the mutual interdependencies.



Management planning as well as scheduling must be done by people who are experienced in and thoroughly familiar with the type of field work involved.

Similarly many writers often mistakenly take "control" for "planning", control is complimentary to planning. Control involves comparing at regular intervals the actual achievement with plans and the taken any necessary collective action to bring things back on schedule.

During the construction period, advancement of the work is monitored by necessary and reporting the full progress at regular intervals.

Generally in Real Property Management and Development, for effective management especially for that of commercial property, such as offices, shops, warehouses, etc. the following must be fully considered.

- (a) Work Management: This is to provide functional data to assist in making decisions and to enable it to be maximally utilized.
- (b) Method Study: This determines the optimum layouts and the most effective use of resources.
- (c) Recording Techniques: There are three main groups of recording techniques available or setting down a problem. These are:
  - (i) Flow process charts: To solve problem layouts
  - (ii) Flow Diagrams: Used in conjunction with a flow process chart to show where the activities take place.



- (iii) String Diagrams: This very important in solving problems of movement.
- (d) Critical Examination: Is the key step in a method study and consist of a detailed examination of every aspect of the work.
- (e) Work Measurement: It determines the time it takes a qualified worker to carry out a specific job at a defined level of performance and to eliminate ineffective elements of work. the work measurement techniques common in the construction industries are:
  - (i) Time study
  - (ii) Activity sampling
  - (iii) Synthesis from standard & sythentic data
  - (iv) Analytical estimating
- (f) The Real Property Budgets: It enables the project manager to know the amount of capital that would be needed for a project and which would be required.
- (g) Real Property Cost Control: Before deciding upon the degree of sophistication of a system of project cost control, consideration must be given to the cost of operating the system and the benefits it provides. Clearly, a balance should be reached between the two.



The use of Allocation sheet, weekly summary sheet and weekly cost control sheet are very important and shall be fully considered in chapter four.

## 2.2 The Role of Property Developer and Manager in Construction Industry.

Whatever name is given to the role of property developer, be it project manager, project controller or property co-ordinators, the idea is that one person should have the over all control and should be responsible for co-ordinating the activation of the various consultants, contractors, sub-contractors, processes and procedures for the full duration of the project.

The titles listed above attempt to describe a particular role and should not be confused with similar titles such as construction management. This generally means the management of the site and this is more akin to production or contractor's management.

The role of property developers and manager are combined. In this context the property manager not only organises and controls the design and construction processes, but also manages the construction site work. The property manager is also responsible for getting the project completed within the time and cost limits. He acts as the focal points for all facet of the project and bring together the effort of all organisation having input the construction process. The co-ordination matters relevant



to the project and directs project operation by dealing directly with individual and organisation involved.

An important aspect of project manager's position is that his duties are normally separated from those of field supervision.

Nevertheless, centralised authority is necessary for the proper conduct of a construction project, and the property manager is the central figure.



## CHAPTER THREE

### COMMERCIAL PROPERTY AS A REAL PROPERTY

#### 3.1 Property For Study

Having discussed commercial property and its type, the type for the purpose of this project must be stated and it shall be guide to our study as to involvement of computer to its appraisal development and management.

The Property of study is a SHOPPING COMPLEX with two floors, stair case and all other facilities/amenities that make up a complex, such as: car parks, open space, fire escape routes external works etc.

On this "SHOPPING COMPLEX" the various stages of operation shall be considered from clearing of site to completion as well as occupation and all these entail the scope of this work which is the appraisal, development and management of the property.

#### 3.3 Research, Design & Methodology

It shall be considered here the various techniques of carrying out "appraisals", methods and implementation. It should be stated here that the appraisal, development and management of Real Property is the job of Project Manager, property manager who may be an Estate Surveyor, Quantity Surveyor or an Architect as the case may be..

He or she should have the overall control over and responsibility for co-ordinating the activities of the various consultants, contractors,



sub-contractors, processes and procedures for the full duration of the project and all these activities fall under appraisal, development and management of the property.

In this context the property manager not only organises and controls the design and construction processes, but also manages the construction site work, and the job must be completed within the time and cost limits.

During the construction / development period, the advancement of the work is monitored by measuring and reporting the field progress at regular intervals. These data are analysed and time-control measures are taken as appropriate to keep the work progressing on schedule.

Such progress can be recorded on pictorial by colouring plans and elevation when certain section works are completed. This method is often used on all property development and gives quick visual impression of overall progress.

### THE CRITICAL PATH METHODS OF APPRAISAL

The critical path method (C.P.M) of appraisal is one of a number of techniques based on a network. It is primarily a tool of the construction industry because it lends itself well to project on which times can be predicted with a higher degree of certainty.

Many others have been evolved using a network as their basis, such as PERT (Programme Evaluation and Review Technique) which



was used by the U.S. Navy, in the development of the Polaris missile system.

Network for small projects can be successfully analysed manually, but the larger projects the computer becomes necessary to save time in analysis, re-analysis and up-dating the network.

### NETWORK ANALYSIS (CPM NETWORK DIAGRAM)

The heart of CPM is a graphical programme that shows all the construction operation necessary for job completion and the order on which they will be done. This graphic network portrays, in simple and direct form, the complex time relationships and constraints among the various segments of a project. It has advantage of easy accommodation modifications. It provides the property manager with the following invaluable time control information and devices.

1. Concise information regarding the planned sequence of construction operation.
2. Proposed calendar dates at which it is planned that the several activities of the project will be started and finished.
3. A basis for balanced scheduling of manpower and constructions equipment on the project.
4. The rapid evaluation of the time requirements of alternative construction method.
5. A convenient vehicle for progress reporting recording and analysis.

6. A basis for evaluation the time effects of construction changes and delays.

The advantages of network planning are that the smaller self contained steps used in creating the network and experimenting with the sequence of activities are more applicable to complex projects and that computers can be employed to aid the analysis.

The steps in producing a network are:

- (a) Listing the activities
- (b) Producing a logic diagram
- (c) Estimating the duration of each activity and calculating the start and finish times of each activity and the that available, and
- (d) Estimating the resources required by each activity and
  - (i) Calculating resource aggregations or
  - (ii) Undertaking resource allocation exercises.

The two approaches to network analysis are activity on the arrow and activity of the node (precedence diagrams).

### ACTIVITY ON THE ARROW

This is one of the two symbolic conventions currently used to draw construction networks and it shows each activity as an arrow. The preparation of a network plan based on the activity on the arrow is as follows.

(a) LISTING THE ACTIVITIES

A list of activities is created and as for bar chart the level of detailed is commensulated with roads.

(b) LOGIC DIAGRAM

In activity on the arrow systems the activity is represented by an "arrow". As the initial logic diagrams are not normally drawn to a time scale the length of each arrow has no significance.

The arrows each representing an activity are joined together in a logic relationship. An each arrow is drawn into the network three questions are asked in order to check that correct logic is maintained.

- (1) Which activities must be completed before this activity starts?
- (2) Which activities cannot start until this activity is completed?
- (3) Which activities have no logical relationship with this activities and therefore can take place at the?

Taking the case study, let consider the precedence diagram for the sequence of activities.

A precedence diagram for the sequence of activities.

TABLE 1: DEPENDENT LIST

Activity No.	Activity Description	Depends on
2	Clear site	2
3	Pile testing	3



4	Pile heater house	4
5	Exc heater flown fond	5 overlap 2wks
6	Construct heater house fond	6
7	Heater house super structure	7
8	Install, plant, & Commission	start + 10wks
9	Shut file sludge well	9
10	Exc and constant sludge well	10
11	Withdraw shut piling	11
12	Construct value chamber	
13	Pile cons and tanks	3
14	Console chambers & duct B	13
15	Console tank bass	14
16	Console tank walls	15
17	Test and commission console tanks	16
18	Pile Tanks P1 and S1	3
19	Exc and Blind P1 & S1	18
20	Construct bass P1 & S1	19
21	Construct Walls P1 & S1	20
22	Construct roof P1	21
23	Install plant test & commission	22

## METHOD STUDY AND WORK MANAGEMENT

Method study measurements, which are very closely related, are two main aspect of work-study. The purpose of work-study is the provisions of functional data to assist management in making decisions and to enable them utilize them with maximum efficiency.

### METHOD STUDY

The aim of method study is to provide information which assist management in taking decisions related to the method it is proposed to use by making a systematic analysis of a problem and developing alternative methods, thus determining the optimum layouts and the most effective use of resources.

There are six basic steps involved in carrying out a method study:

1. Select the work to be studied and define the problem.
2. Record the relevant facts using the recording techniques.
3. Examine these facts critically and without bias to ascertain whether each element in the work is necessary, asking a series of questions and examining alternative solution.
4. Install the new method installation by following the decision by the management to accept the method.
5. Maintaining the new method. This consist of checking that the new method is adhered to by regular inspection on site or by watching output records which will indicate deviations from the standard set.

## **CRITICAL EXAMINATION**

The step examine is the key step in a method study and consist of a detailed examination of every aspect of the work.

The purpose is to:

1. Establish the reasons for these facts and determine whether they are valid.
2. In this foundation to consider all the possible alteration and hence the optimum solution. (see Appendix)

## **WORK MEASUREMENT**

The aim of work measurement is to determine the time it takes for a qualified worker to carry out or specific job at a defined level of performance and to eliminate ineffective elements of work. it seeks to provide the standard times for jobs and thus supplies basic, essential data for management.

The work measurement techniques common in the construction industries are:

- (a) Time study
- (b) Activity sampling
- (c) Synthesis from standard & synthetic data
- (d) Analytical estimating



### **(a) TIME STUDY**

The stages involved in carrying out time study are:

- (1) Selecting the work to be measured.
- (2) Analysing and breaking the work down into elements.
- (3) Rating and timing each element.
- (4) Extending the observed time to basic time.
- (5) Selecting basic times, allocating allowances and building up the final standard.

### **METHOD OF TIMING**

The methods of timing commonly used in the construction industry are cumulative timing and fly back timing.

Cumulative timing is the more common as it is better for observing a number of operations in a development and each operation recorded after each element.

### **WORKING UP THE STANDARD TIME FOR AN OPERATION**

#### **CASE For Example:**

To determine a standard time, a number of time studies of the operation will have to be completed; it is here assumed that this has been done using cumulative timing.

In this example the following terms are used:

ELEMENT	A distinct part of an operation which can be easily defined.
RATING	The method used to take in to account variations in working pace.
CUMULATIVE TIME	The time recorded on the study sheet
OBSERVED TIME	The time taken to perform an element of work.
STANDARD RATING	The average rate at which a qualified man will work given sufficient motivation and instruction.
BASIC TIME	The time required for carrying out an element of work at standard rating.
RELAXATION ALLOWANCE	The time given to allow a worker to recover from the effects of fatigue and to attend to personal needs.
CONTIGENCY ALLOWANCE	The time given to allow for occurrences throughout the duration e.g. a painter dressing brushes



## METHOD USED FOR STANDARD TIME

1. Calculate the observed time for each element by subtracting the previous cumulative time from the cumulative time for the element in questions. Check that the total observed time equals the last cumulative time recorded. (see Fig. 3.1)
2. Extend the observed time s to basic times i.e. show all times at the standard rating by taking the observed rating in to account. The formula for this calculation (fig 3.2) is

$$\frac{\text{Observed time} \times \text{observed rating}}{\text{Standard rating}}$$

- 3 Calculate the average of the basic times over the series of studies (fig 3.3)
- 4 Add the appropriate relation allowances & contingency allowances (fig 3.4) renumbering that unoccupied time allowance and interference allowance must also sometimes be made.]

This procedure will give the standard time for each element; to calculate the standard time for an operation, add the elements in the operation together.

NOTE: The example is simplified and the times are hypothetical.

Operation concerning upper floor slabs

Fig 3.1

ELEMENT	RATING	CUMULATIVE TIME	OBSERVED TIME
Check time		2.75	2.75
A. Discharge crane skip	85	2.99	0.24
B. Spread concrete	77	4.89	1.90
C. Vibrate concrete	100	5.33	0.44
D. Level & stamp concrete	95		
	85		
	90	7.63	<u>2.30</u>
			<u>7.63</u>

Fig 3.2

ELEMENT	RATING	CUMULATIVE TIME	OBSERVED BASIC TIME
Check time	85	2.78	2.75
A. Discharge crane skip	85	2.99	0.24
			$0.24 \times 85$ $= 0.20$ <hr/> 100
B. Spread concrete	77	4.89	1.90
			$1.90 \times 75 = 1.43$ <hr/> 100
C. Vibrate concrete	100	5.33	0.44
			$0.44 \times 100 = 0.44$ 100
D. Level & stamp concrete	95	7.63	2.30
			$2.30 \times 90 = 2.07$ <hr/> 100
	90	-	7.63
	85		
	90		



Fig 3.3

ELEMENT		FREQUENCY	AVER AGE
A .Discharge crane skip	0.20, 0.18, 0.19, 0.20 0.18, 0.21, 0.18, 0.19, 0.18	1.70	100.19
B. Spread concrete	1.05, 1.23, 1.31, 15.00 1.49, 1.45, 1.45, 1.22, 1.48, 1.80, 1.60	10	1.50
C. Vibrate concrete	0.44, 0.46, 0.44, 4.40 0.42, 0.45, 0.45, 0.44, 0.43, 0.43	10	0.44
D. Level & stamp concrete	2.07, 2.13, 2.35, 22.00 2.35, 2.23, 2.27, 2.24, 2.00, 2.16, 2.70	10	2.20

Let assume that the total relaxation allowance and contingency allowance are as follows.

Fig 3.4 Element	Basic Total	Contingency Total	Standard
	Time Relaxation Allowance	Allowance time minutes	
A. Discharge Crane skip	0.19 25% 5%	30%	$\frac{0.19 \times 130 = 0.25}{100}$

B. Spread concrete	1.50	30%	5%	35%	$\frac{1.50 \times 135 = 1.95}{100}$
C. Vibrate	0.44	26%	5%	31%	$\frac{0.44 \times 131 = 0.58}{100}$
D. Level and tamp concrete	2.20	30%	5%	35%	$\frac{2.20 \times 135 = 2.97}{100}$

The standard time for the operations is:

$$0.25 + 1.95 + 0.50 + 2.97 = 5.75 \text{ standard minutes.}$$

#### (a) ACTIVITY SAMPLING

Activity sampling is also commonly known as soap observation studies or random observation studies, it is very useful techniques in the construction industry and is used to determine the activity levels of machines and operatives using the method a number of subjects can be observed currently.

In this procedure the principles of the statistical random samples are used. Snap reading, are taken at intervals and the percentage of readings taken per element will give a result very near to the actual percentage on each providing the sample is big enough, from this it is possible to calculate the time taken on each element if necessary.

One observer can record the activities of a whole gang and readings can be almost continuous. The timing may be by either the fixed



interval method (easier to use on site) or the random interval method which is better for work of a cyclic nature.

### USES OF ACTIVITY SAMPLING

On site activity sampling can be used

1. To assess unoccupied time as a basis for analysis lost.
2. To find the percentage of time spent on each element of work in operation by each operation and for machine.
3. To find the percentage utilization of machine or operatives as a basis for cutting down unoccupied time.

### (b) SYNTHESIS AND SYTHETIC DATA

The propose synthetic data is to enable time values to be compiled for jobs whose direct measurement is unnecessary or impracticable. Many operation are similar to ones which have been carried out before, perhaps with variation due to physical dimension etc. (examples are: saving different length of times and powering different areas). These various jobs have many common elements and a suitable referenced stock of data relating to these elements can be built up over a period of time and used for quickly compiling the work content of various jobs.

### (c) ANALYTICAL ESTIMATING

To calculate the work content of non-repetitive jobs, the work value can be compiled by analytical estimation using whatever

information that is available from past time studies or standard data and estimating the time for remaining elements.

## COST CONTROL

Project cost control begins with the preparation of the original cost estimate and the subsequent budget. As the work proceeds in the field cost control techniques are applied to determine the unit cost of operations, and hence determine where the job cost are deviating from the budget. In addition to the monitoring of current expenses, periodic reports are prepared that force as final project costs and compare these predicted costs with established budget.

However, since I intend to prepare a computer program based on Real Property Appraisal, development and management in chapter four it is necessary we look at the following.

- (a) Allocation sheet
- (b) Weekly cost control sheet

There are means of collecting information for cost controls and sample copies are included in the appendix.

### (a) ALLOCATION SHEET

This is the daily record of home worked by an operative or gang from which the hours spent on an operation can be obtained.

The sheets are the basis of cost control system and must therefore be accurately complied by the man in charge of the gang to achieve this



accuracy, they should be completed daily. It is necessary to adequately check and verify the per operation.

(b) WEEKLY SUMMARY SHEET

This sheet is used to collect all the information in operational hours from the daily allocation sheets, and would be compiled by the cost surveyor at the end of each week. The hours recorded on the allocation sheets are ordinary hours and not overtime spent on operations, so that the weekly summary sheet presents the total basic hours spent on a operation in the week. This information is required for calculating the amount of bonus payable as well as for inspection in the weekly cost sheets.

(c) THE WEEKLY COST CONTROL SHEET

This is used for the collection of all the information arrived at Via the allocation sheets, summary sheets and records of measure. The unit cost for each operation can then be calculated and the comparison with set unit targets.

### 3.4 APPRAISAL: FLOW CHART

#### Recording Techniques:

There are three main groups of recording techniques available or setting down a problem. These are:

- (a) CHARTS                      outline process charts flow process charts



(b) **DIAGRAM AND MODELS** Flow diagrams, storing diagrams  
cut-out templates, models.

(c) **PHYSTOGRAPHS** Photograph films

(a) **FLOW PROGRESS CHARTS**

This technique can be useful in helping to solve problems of layout such as these in site workshop areas where the operations are likely to be repetitive.

All activities are shown by mean of symbols with a description against each activity. This is a very simple method of showing a sequence of work, and employs the following symbols.

OPERATION STORAGE e.g. stored for future use.

INSPECTION

TRANSPORT TEMPORARY STORAGE OR DELAY.

The movements of men, materials or equipment are followed through process and the symbols are used to indicate what is happening at the various stages the distance travelled may be shown on the transport activities and the time for each element can be given.

(b) **FLOW DIAGRAMS**

A flow diagram can be used in conjunction with a flow process chart to show where the activities takes place. The same symbol that are employed on flow process charts are listed but in this case they are super imposed in to a drawing and the descriptions are not necessary.



All movements and distances can be clearly shown.

(c) STRING DIAGRAMS

This technique is very useful in solving problems of movement. It is applied to repetitive situations and is therefore most useful in working area such as machines shops, pre-casting yards, steel bending areas on site etc. In diagram will show up points of congestion and any excessive distances travelled.

The procedure for improving a layout is to first draw to scale a plan of the area under consideration with the work places or stacking areas etc. and all changes in direction denoted by pins. String or thread is then tied round the starting point and passed from pin showing movement.

Men, materials or machines can be denoted by different coloured string. If the string is then measured, any excessive distances travelled will be obvious and any point of congestion will be seen on the diagram.

Routes which are travelled regularly should be kept as short as possible and alternatively methods can be examined to eliminate the fault of the first.



## CHAPTER FOUR

### THE COMPUTER AND REAL PROPERTY

#### 4.1. Introduction To Computer And Computer Application

It is highly observed that there is a considerable debate about the influence and importance of computers and the property development and management, the usefulness of computers for many of the routine and mundane processes ranging from bill programs, estimating, taking-off or the calculator of fees, salaries and other financial records. Application of computers system should therefore not pose a threat to real property appraisal, development and management, rather it should be seen as easy tool to quick and fast development and management.

#### COMPUTER TYPES/CLASSIFICATIONS.

There are several methods of classifying computers. Hence, the main distinction by type is given first, followed by classification by purpose and a further classification based on size.

- a. **DIGITAL** - A digital computer is basically electronic calculating data (which are coded in simple binary digit form- hence the name – "DIGITAL")



- b. **ANALOG** – These computers are akin to measuring instruments such as thermometers, voltmeters and speedometers. They measure or compare data/ value and do not contain memory.
- c. **HYBRID** – These are computers which have the combined features of digital and analog computers.

### PURPOSE

- a. **SPECIAL PURPOSE** – These are computers designed for use in digital watches.
- b. **GENERAL PURPOSE** – Computer designed to solve a wide variety of problems are called general purpose machines.

### FURTHER CLASSIFICATION

- a. **MAINFRAMES** – Large general purpose computers with extensive processing, storage and input/output capabilities.
- b. **MINI COMPUTERS** – Physically smaller computers compared with mainframes. They are used for special purposes or smaller scale general purpose work.
- c. **MICRO COMPUTERS** – Also called personal computers, these are small, one user, computer that are relatively in expensive, they can be programmed or used in a manner similar to that of mainframe, but are slower and cannot store as much data as the mainframe.



## HARDWARE, SOFTWARE AND HUMANWARE

- a. **HARDWARE** – Is the general term used to describe all electronic and mechanical element of the computer together with those devices use with the computer. The hardware devices used for input, output and auxiliary storage are called PERIPHERAL DRVVICE.
- b. **SOFTWARE** – Is the general term used to describe all the various programs which may be used on a computer system together with their associated documentation. The main classes of software are:
  - i. **APPLICATION SOFTWARE** – Which is designed to put to specific practical use and is further sub-divided into SPECIALIST APPLICATION SOFT WARE designed specifically to carry out particular taste e.g controlling a company's stock of goods and APPLICATION PACKAGES – used for particular type of problem, e. g payroll packages.
  - ii. **SYSTEM SOFTWARE** – These are programs with associated document which control the way the computer operator. An important program or set of program within the set of systems software is the OPERATING SYSTEM.
- c. **HUMAN OR LIFE WARE** – The computer human system embodies all these persons or human beings that are engage in the design construction, maintenance and use of computers.



An organisation needs information on which to base decision concerning the current operations and future plans. It requires this information to be timely and accurate.

Despite the simplicity of the data reduction procedures, however, manual methods can involve, however, manual methods can involve appreciable time and property development and computation errors are always possible. To a large extent, the property development and manager is relying on digital computer and associated items of data processing equipment to provide management information. Project developers, must read quickly to changing condition and their decisions should be made with the secure knowledge that they are acting on the basis of adequate, accurate and current information. The computer can help to make this possible as well as to assist with the evaluation of alternative courses of action.

Some of the uses of computer in the areas of property development and management may include.

- a. **LABOUR CONTROL** – Much of the information used in the control of labour can be obtained from payroll and personal records applications. Ideally they will all be part of an integrated system, an analysis of labour hours to various categories, department and sectional summaries help to highlight these problems on wider basis. Actual performance is measure against budgeted performance. Daily reports for the manager and control



of routine operations. Reports of a more general nature will aid overall manpower utilisation.

- b. **NET ANALYSIS** – This techniques, like it has been seen is used for the planning and control of large and complies projects. When the necessary data has been supplied, the program produces a plan which management can (see computers and network analysis later in this chapter).

Operations are all example of computer application to the solution of specific management problems. Many of the procedures, and techniques used in property management are possible without a computer, but it is the speed and accuracy with which the computer carries them out that make it such an invaluable tool of management.

The computations involved in the time scheduling of projects involved only elementary arithmetic. Nevertheless, the manipulation of large quantities of even simple calculations can be tedious and time consuming. Smaller Network say up to 200 activities can be rapidly and economically handled by manual methods, but this becomes increasingly difficult when longer networks are involved. Additionally, prompt updating is crucial to project time control and keeping the schedule up-to-date by hand becomes a burden, even for small project. Consequently, project developers generally find out that computer is a necessary part of any project management system, even one limited to only basic time and cost control functions. The property developer's familiarity with the afore - mentioned



and sing store productivity and cost information, generates cost of all kinds.

### **COMPUTERS AND NETWORK ANALYSIS**

Network analysis (see chapter three) forms a very important aspect of property appraisal development and management, so there are many commercially available computer program which perform it calculations. However, non availability of such programs in the immediate environment has hindered the practical application of computers to network analysis in this project work, a brief discussion may be necessary.

Programs for network analysis are available for both activities in the node (Precedence diagram) as were discussed in chapter three. The differences in the input, in particular the relationship, between activities that are offered in the various programs.

### **ARROW NETWORKS**

The basic input data arrow network computers package is required for each activity in the simplest programs are:

- \* Activity identifies (e. g. start and finish event numbers)
- \* Activity duration
- \* Duration and
- \* Resource requirement for 'n' different resource type

- \* The general data input required by such programs which relate to programs as a whole will include data that prescribe the limits of each type of resource available to execute the project.

On input of this information the available computer programs will:

- \* Calculate event times
- \* Calculate float
- \* Produce tables which list all activities with start and finish dates, duration and float.
- \* Draw bar charts with all activities starting as early as possible.
- \* Resource limited analysis and re-schedule the sequence of activities to produce resource aggregation charts that are within the constraints of the prescribed resource limits.

### **PRECEDENCE DIAGRAMS**

The basic input data to precedence diagram computer packages required for the simplest programs are:

- \* Activity identifier
- \* Activity dependency
- \* Activity description
- \* Duration, and
- \* Resource requirements for different resource type.



On input of the necessary information the available computer programs will execute similar calculations and produce similar information to that described for arrow networks.

### **RESOURCE ANALYSIS**

Resource analysis and manipulation of the activity sequence is the representative of the type of analysis undertaken in the production of the pre-tender plan. More extensive analysis and manipulation usually require the use of computer program.

### **PROGRAM DESCRIPTION/SCREEN DISPLAY.**

The property development and management uses the data base management system and the modular programming method is adopted.

In order to reduce the complexity to this data base management system, three modules were designed, each of which carries out a specific task viz:

- a. The daily allocation sheet.
- b. The weekly summary sheet and
- c. The weekly cost control sheet.

However these sub programs, are put together to form the integrated data base management system – PROJECT COST CONTROL SYSTEM. By calling the main program into memory (type "do project") a screen design as shown in fig A1 (see Appendix 1) appear. This gig (A1) is self explanatory.



It welcomes you to the program and on arrow indicate the next rational to be taken in order to run the program, to provide security to the package and reduce the risk of unnecessary data getting into the database files, a system of password is introduced, this allows only authorised person (s) with the knowledge of the password to gain access into the rest of the program. After typing the right password (see Program is Appendix) a main menu (fig A2) provides four options 1 to 4 on the screen. Any of these selected will give the necessary instruction required for the program to continue the four options are further described as follows

#### **1. DAILY ALLOCATION SHEET**

This option accepts data via a data capture program which presents an entry form (see fig. A3) for input of the necessary data. The program then processes these data, appends the base file to store new record in yet another screen display (A fig. A4) out put the result of computation for daily activities.

#### **2. WEEKLY SUMMARY SHEET.**

The weekly summary sheet program provides data capture in a multiple of screen displays. Each of these request for and accepts data before the computer undertakes a long search into the daily records for the whole week using the updates from the daily allocation sheet program, this is then computed and stored in a base file for weekly record of work done. Fig A5 stores a screen display of this weekly record.



applications is therefore, an additional advantage to the application of computer to property appraisal, developments and management.

4.2

#### **COMPUTER INVOLVEMENT IN PROPERTY APPRAISAL, DEVELOPMENT AND MANAGEMENT.**

The extent of which the computer is being applied to property appraisal development and management varies from one manager to another. However, the following are some project functions to which the computer is currently being successfully applied.

- a. **PROJECT PLANNING AND SCHEDULING** – The computer generates activities as well as completion time for the project and scheduling, allocation of manpower and construction equipment.
- b. **PAYROLL AND LABOUR COST** – The computer can be programmed to handle payroll checks, periodic and special payroll reports, productivity rates, and labour unit costs. Production rates and unit cost are summarized for control purposes on current projects, classified and store for use on the estimating of new work
- c. **EQUIPEMENT RECORDS AND COSTS** – The computer maintains records on ownership and operating costs, hours of operation, maintenance, and production data for each major item of operation equipment. A Data base program for project control has been developed and is presented later.
- d. **ESTIMATING** – The computer working closely with the estimators



### **3 WEEKLY COST CONTROL SHEET**

Option 3 program module presents a single entry form (fig. A6) to capture necessary data and information from 1 and 2 above also serves as input data.

When all computations are complete, the result or output is appended into another base file (created for the purpose) and is also displayed in a formatted screen (fig. A7).

The number of activities fed into the computer determines the number of times both the data entry form and the output will appear on the screen.

### **QUIT THE PROGRAM**

This is the last option from the main menu forms part of the main program (project program). It is only selected when the user wishes to go back to the dbase system command line.

### **DATA ENTRY**

Different data entry screen formations have been described, the necessary data required will be requested by the program. It is however, worthwhile to state that only useful data that were carefully recorded accurately on site will produce any meaningful result for proper management, the computer serves you very well if you keep in mind the garbage out "syndrome, and adopt the proper use of data.



## CHAPTER FIVE

### SUMMARY & RECOMMENDATION

#### 5.1 SUMMARY OF FINDING

The researchers findings will in no doubt help the Real Property Development and managers that may as well be called the "Project developers"; to know the effectiveness of the computer in the management of Real Properties.

Based on the above fact, the main findings of this work could be summarised thus:

That the strength and accuracy of the management of property through computer depends on the accuracy of the data entered through careful manual operations.

That outcome of well designed and arranged computer programs on the development and management of property have an easy, smooth and speed on the completion of the project, i.e. have a direct relationship with job satisfaction.

Also, that the objectivity of property development and management depends on the procedure itself. The procedure in which the exercise is carried out i.e. the manual will determine the objectivity of the performance through computer introduction.

It was discovered that where good property development and management program on computer is effective, it would lead to



efficiency of the workforce. Workers would be able to know their weak points on the project so that they can change for better and they are also able to know their strong areas so that they can improve on them and do better. It will aid the completion at the stipulated time.

From the above findings, it will be seen that adequate and effective implementation of Real Property Appraisal, development and management programs has helped in increasing the efficiency of the developers and has motivated them in their profession.

## 5.2 REPORT GENERATION

There is always a need to provide some facilities for obtaining some hard copies of the result for any system developed. This system is designed to adequately satisfy that need.

As it has been mentioned, the system generates a number of report forms which are included in appendix 1 and these represent hard copies of the result for storage and other managerial functions.

## 5.3 CONCLUSION

Property appraisal, development and management is an important task that needs to be performed on the computer for effectiveness and efficiency of professionals on their job. Without the introduction of computer, the problems of breaking of operations in to different stages thereby making it to be cumbersome might not be alleviated.



Therefore, for an effective computer programs on Real Property development and management, the exercise itself must be carried out without any mistake of data entries and the same standard according to professional codes must be applied. There must also be trust and acceptance of the programs by the professionals to facilitates promptness and effectiveness of the job.

#### 5.4 RECOMMENDATIONS

In the final analysis, we wish to recommend the following;

1. All members of the construction team who have not had any knowledge of the use of the computer should take up diploma courses or make up other arrangement to catch up with fast changing scene.
2. Developers who are familiar with some of the many computer packages for management should also endeavour to familiarize themselves with various project management softwares.
3. Some knowledge of computer programming may do well to the property developer who may wish to see that his idea has been transformed in to reality.
4. Professional as well as the workers in the site should have or develop trust in the efficacy of computer in property development.



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## APPENDIX

### PROPERTY DEVELOPMENT AND MANAGEMENT SYSTEM

#### A program for effective REAL PROPERTY APPRAISAL, DEVELOPMENT AND MANAGEMENT

You are welcome please. This is a property Development and management package. The package will enable you to effectively monitor the unit cost of each operation or activity in a project. I believe you will surely find it very helpful.

To continue with the program, press the ENTER KEY or ESCAPE to exit.

Thank you.

Fig. A1.

## MENU LIST

1. DAILY ALLOCATION SHEET
2. WEEKLY SUMMARY
3. WEEKLY COST CONTROL SHEET
4. QUIT THE PROGRAM

ENTRE THE NUMBER OF CHOICE FROM THE MENU LIST [0]

Fig. A2.



CLEAR

\* PROGRAM FOR PROPERTY APPRAISAL, DEVELOPMENT AND MANAGEMENT

Set talk off

Set echo off

Set status on

Set delimiter on

Set delimiter to []

Set escape on

Clear all

Clear

On escape exit

Store space(6) to password

Set color to

text

You are Welcome Please. This is a Property Development And Managemen

To continue with the program, press the ENTER KEY or ESCAPE KEY to exit.

THANK YOU.

Endtext

@3,20 say "\*"

@3,50 say repl("-",29)

@3,50 say "\*"

@4,20 say "\*"

@4,22 say "PROPERTY APPRAISAL,DEVELOPMENT AND MANAGEMENT"

@4,49 say " "

@4,50 say "\*"

@5,20 say "\*"

@5,21 say "-----"

@5,50 say "\*"

@6,14 say "A PROGRAM FOR EFFECTIVE PROPERTY MANAGEMENT"

@7,13 say repl("-",44)

@9,6 say repl(" ",63)

Set color to

@10,0 say repl(" ",5)

@11,0 say repl(" ",5)

@12,0 say repl(" ",5)

@14,0

@14,1

@15,0

@16,0

@17,6

Set color to

@8,5 to 18,69 double

Set console off

Wait

Set console on

Set color to

Clear

Set color to R/G,GR+

@10,13 to 14,55 double

@12,15 say "now, please enter your"

Set color to g

@12,38 say "password"

Set color to g

@12,47 get password picture "@A!"

Set color to g

Read

If password = "MARMUS"

Do while .t.

Clear all

Set color to GR/RB+

Clear

L=0

Do while L =24

@L,0 say replicate(chr(178),79)



```

L=L-1
Enddo
Set color to W+/B
@6,10 to 21,68 double
set color to
set color to bG/GR+
@8,29 say "MENU LIST"
@9,29 say "-----"
@11,25 say "1. DAILY ALLOCATION SHEET"
@13,25 say "2. WEEKLY SUMMARY SHEET"
@15,25 say "3. WEEKLY LIST CONTROL SHEET"
@17,25 say "4. QUIT THE PROGRAM"
CHO=SPACE(1)
@19,12 say "ENTER THE NUMBER OF YOUR CHOICE FROM THE MENU LIST" get CHO
read
clear
do case
case cho='1'
do VIC2
case cho='2'
do VIC3
case cho='3'
do VIC4
case cho='4'
clear
exit
endcase
enddo
else
clear
set color to W+/B
?
?
?
?
?
?
?
?
text
    sorry, you have given a wrong password, therefore you have no authori
Thank you.
Endtext
@8,7 say repli (" ",61)
@9,7 say repli (" ",22)
@9,29 say "WARNING!"
@9,37 say repli (" ",31)
@11,2 say "==>>"
@10,7 say repli(" ",22)
@10,29 say "-----"
@10,37 say repli (" ",31)
@7,6 to 15,67 double
set color to
set color to B/W
@20,12 say "Now, Press any key to leave this environment---"
Set console off
Wait
Set console on
clear
clear all
set talk on
set status on
endif

```



```

*** PROGRAM FOR DAILY ALLOCATION***
set talk off
set status off
set echo off
set delimiter on
set delimiter to []
clear
on escape exit
use dads
go top
b=2
do while .t.
if b=2
store space(40) to mopde
store space(20) to mname
store space(15) to mprof
store space(9) to msurname
store 0 to mpno,mopno
store 0 to mthr
store 0 to mlabhr
store 0 to mstphr
store 0 to mtothr
store 0 to mpophr
store space(20) to mpname
store 0 to mpsthr
store 0 to mpttothr
store ctod(" / / ") to mdate
endif
clear
set color to b/w,n/g,gr+
@4,3 to 20,78 doub
@6,48 say "DATE OF OPERATION:" get mdate
@8,50 say "OPERATION NO:" get mopno pict "9999999"
@10,05 say "OPERATION DESCRIPTION:" get mopde pict "@15x!"
@12,05 say "NAME OF OPERATIVE :" get mname pict "@x!"
@12,45 say "PROFESSION:" get mprof pict "@x!"
@14,05 say "TRADE HOUR: " get mthr pict "9999"
@14,33 say "LABOUR HOUR : " get mlabhr pict "9999"
@14,55 say "STOPPAGE HOUR: " get mstphr pict "9999"
@16,05 say "PLANT NAME:" get mpname pict "@S13X!"
@16,40 say "NUMBER OF PLANT USED:" get mpno pict "@9999"
@18,05 say "PLANT OPERATION HOUR: " get mpophr pict "@9999"
@18,40 say "PLANT STANDING HOUR: " get mpsthr pict "@9999"
read
conf=.T.
@22,10 say "ARE THE DATA VALID FOR SAVING? CONFIRM (Y/N)" get conf pict "@A!"
read
if conf
mtothr = mlabhr + mstphr
mtothr = mlabhr + mthr + mstphr
mpttothr = mpophr + mpsthr
*if recount() = 9000000000
*zap
*endif
append blank
Replace date with mdate
Replace op_num with mopno
Replace op_descrip with mopde
Replace op_name with mname
Replace profession with mprof
Replace th_hr with mthr
Replace lab_hr with mlabhr
Replace p_sthr with mstphr
Replace p_name with mpname

```



Replace nu\_pused with mpno  
Replace po\_phr with mpophr  
Replace tot\_hr with mtothr  
Replace p\_ttothr with mpttothr  
Clear

Set color to R/W,N/G,BG+

@3,02 to 17,76 double

@5,31 say "DAILY ALLOCATION SHEET"

@6,30 say replicate("-",24)

@7,4 say "CONTRACT NO:"

@7,52 say "SHEET NO:"

\*+ltrim(str(recount()+1,8))

@8,4 say "DATE OF OPERATION:" + dtoc(mdate)

@8,52 say "COMPILED BY:" get msurname picture "@s12x!"

@9,3 say replicate("=",73)

@10,17 say "OPERATION NO:" + ltrim(str(mopno))

@12,4 say "DESCRIPTION OF OPERATION: " + trim(mopde)

@14,4 say "NAME OF OPERATIVE: " + trim(mname)

@14,44 say "PROFESSION: " + trim(mprof)

@16,17 say "LABOUR HOUR: " + ltrim(str(mlabhr))

@16,33 say "STOPPAGE HOUR: " + ltrim(str(mstphr,3))

@16,55 say "OPERATIVE TOTAL: " + ltrim(str(mtothr,4))

@18,14 say "PLANT USED"

@18,31 say "PLANT NO"

@18,43 say "op-hr"

@18,52 say "st-hr"

@18,61 say "PLANT TOTAL"

@19,3 say replicate("-",73)

@18,27 to 22,27 double

@18,40 to 22,40 double

@18,49 to 22,49 double

@18,58 to 22,58 double

\*@18,72 to 22,72 double

@18,76 to 22,76 double

@22,3 say replicate("-",73)

@20,11 say trim(p\_name)

@20,32 say trim(str(nu\_pused,31))

@20,43 say trim(str(po\_phr,31))

@20,52 say trim(str(p\_sthr,31))

@20,62 say trim(str(p\_ttothr,41))

adops=.t.

@23,5 say "This record has been saved!"

@24,5 say "Do you want to enter more record? (Y/N)" get adops Picture "@A!"

Read

If adops

Clear

Loop

Else

Exit

Endif

Else

b=b-2

@21,3 clear to 24,78

@22,10 say "==>> Alright press any key to go back to entry form -----"

set console on

loop

endif

enddo

close data base

clear

return



```
clea
*** PROGRAM FOR WEEKLY SUMMARY SHEET ***
```

```
clear
set color to W/R,G,B
select 1
use Weeks
select 2
use dads
?
?
?
?
?
?
?
?
?
text
```

You are welcome! Please note that this weekly summary sheet" based on the can't update of the daily allocation sheet. To continue with this program press the ENTER key or the ESCAPE key to THANK YOU

```
endtext
@10,24 say "WEEKLY SUMMARY OF WORK DONE"
@6,23 say repl ("-",27)
@7,7 say repl ("-",56)
@9,6 say repl (" ",59)
@15,6 say repl (" ",59)
set color to
set color to W/R,G,b
@12,2 say "==>>"
set color to w/r,g,b
@8,6 to 16,65 double
set console off
wait
set console on
set color to BG+/W,R/W,G
clear
set color to B/GR+,N/G,W
@8,8 to 12,73 double
L= 0
numop = 0
@10,10 say "NOW, ENTER THE NUMBER OF OPERATION OF ACTIVITIES INVOLVED"
read
L = 1
do while L<=numop
clear
store 0 to lwtot,twtot,pwtot,lmond,pmond,ltued,trtued,ptued
store 0 to lwed,twed,pwed,lthud,trthurd,ltrid,tfrid,pfrid,lsatd
store 0 to tsatd,psatd,mwkno,mopnum,sheeno,contno
store 0 to mtothr,mptothr,mwkdone
store space(15) to mplant
store space(15)to comlea
store ctod(' / / ') to mdaw
@13,8 TO 17,54 DOUB
```

```

@15,10 say "Enter the operation number" get mopnum pict "9999999"
read
clear
@15,10 say "Enter date of operation" get mdaw
read
clear
@15,10 say "Enter week number" get mwkno pict "@999"
read
clear
@15,10 say "Enter the contract number" get contno pict "@999"
read
clear
@15,10 say "Enter the plant name used" get mplant pict "@510x!"
read
clear
@15,10 say "Enter the name of compiler" get comlea pict "@315x!"
read
clear
@15,10 say "sheet number" get sheeno pict "999"
read
clea
@13,29 say "PLEASE WAIT...."
@11,26 TO 15,45 doub
sum tr-hr to tmond for op-num=mopnum .and. date = mdaw
sum tot-hr to pmond for op-num=mopnum .and. date=mdaw
pwtot=pwtot + pmond
twtot=twtot+tmond
lwtot=lwtot+lmond
store mdaw+1 to ndaw
locate for date=ndaw
if .not. eof()
if op-num<>mopnum
mopnum=op-num
endif
sum tr-hr to trtued for op-num=mopnum .and. date=ndaw
sum tot-hr to ltued for op-num=mopnum .and. date=ndaw
sum p-tot-hr to ptued for op-num=mopnum .and. date=mdaw
pwtot= pwtot +pmond
twtot=twtot + tmond
lwtot=lwtot +lmond
store mdaw + 1 to ndaw
locate for date = ndaw
if .not. eof()
if op-num<>mopnum
mopnum=op-num
endif
sum tr-hr to trtued for op-num=mopnum .and. date=ndaw
sum tot-hr to ltued for op-num=mopnum .and. date=ndaw
sum p-tot-hr to ptued for op-num=mopnum .and. date=ndaw
endif
pwtot=pwtot + ptued
twtot=twtot + trtued
lwtot=lwtot + ltued
store ndaw+1 to pdaw
locate for date = pdaw
sele 1
replace date_op with sdaw
replace pl_mond with mplant, l_mon with lmond
replace l_tues with ltued, l_wed with lwed
replace l_thur with lthurd, l_fri with lfrid
replace l_sat with lsatd, l_total with lwtot
replace t_mon with tmond, t_tues with trtued
replace t_wed with twed, t_thur with trthur
replace t_fri with tfri, t_sat with tsatd

```



```

replace t_total with twtot, p_mon with pmond
replace p_tues with ptued, p_wed with pwed
replace p_thur with pthud, p_fri with pfrid
replace p_sat with psatd, p_total with pwtot
replace wk_daw with mwkdaw
Clear
set color to bg+/w,n/g,r
@1,1 to 22,77 doub
@3,30 say "weekly sheet"
@4,29 say repl("-",22)
@6,10 say "contrait no:" +trim(str(contno,3))
@8,37 say "compiled by:" +ltrim(ismuka)
set color to rb+
@6,37 say "sheet no:" +trim(str(sheetno,3))
@9,1 say repl("-",17)
@11,3 say "operation no:" +ltrim(str(op_no,3))
@12,21 say repl("-",57)
@15,21 say repl("-",57)
@18,21 say repl("-",57)
@11,23 say "day"
@11,35 say "mon"
@11,41 say "tue"
@11,47 say "wed"
@11,53 say "thur"
@11,59 say "fri"
@11,65 say "sat"
@11,71 say "total"
@9,20 to 21,33
@9,33 to 21,33
@9,45 to 21,45
@9,51 to 21,51
@9,57 to 21,63
@9,62 to 21,63
@9,69 to 21,69
go bott
@14,23 say "labour hrs"
@11,23 say "trade hrs"
@20,23 say "plant hrs"
@17,23 say "plant used"
@19,23 say ltrim(pl-used)
@14,35 say ltrim(str(l-mon,3))
@14,41 say ltrim(str(l-tues,3))
@14,47 say ltrim(str(l-wed,3))
@14,53 say ltrim(str(l-thur,3))
@14,59 say ltrim(str(l-fri,3))
if .not. eof()
if op-num<>mopnum
mopnum=op-num
endif
sum tr-hr to twed for op-num=mopnum .and. date=pdaw
sum tot-hr to lwed for op-num=mopnum .and. date=pdaw
sum ltot-hr to pwed for op-num=mopnum .and. date=pdaw
endif
pwtot=pwtot+pwed
twtot=twtot+twed
lwtot=lwtot+lwed
store pdaw +1 to qdaw
locate for date=qdaw
if .not. eof()
if op-num<>mopnum
mopnum=op-num
endif
sum tr-hr to trthud for op-num=mopnum .and. date=qdaw
sum tot-hr to lthud for op-num=mopnum .and. date=qdaw

```

```

sum p-tot-hr to pthud for op-num=mopnum .and. date=qdaw
endif
pwtot=pwtot+pthud
twtot=twtot+trthud
lwtot=lwtot+lthud
store qdaw +1 to rdaw
locate for date=rdaw
if .not. eof()
if op-num<>mopnum
mopnum=op-num
endif
sum tr-hr to tfrid for op-num=mopnum .and. date=rdaw
sum tot-hr to lfrid for op-num=mopnum .and. date=rdaw
sum p-tot-hr to pfrid for op-num=mopnum .and. date=rdaw
endif
pwtot=pwtot+pfrid
twtot=twtot+tfrid
lwtot=lwtot+lfrid
store rdaw+1 to sdaw
locate for date= sdaw
if .not.eof()
if op-num<>mopnum
mopnum=op-num
endif
sum tr-hr to tsatd for op-num=mopnum .and. date=sdaw
sum tot-hr to lsatd for op-num=mopnum .and. date=sdaw
sum p-tot-hr to psatd for op-num=mopnum .and. date=sdaw
endif
pwtot=pwtot+psatd
twtot=twtot+tsatd
lwtot=lwtot+lsatd
mwkdone=lwtot+pwtot
select 1
append blank
replace wk_no with mwkno, op_no with mopnum
@14,65 say ltrim(str(l-sat,3))
@14,71 say ltrim(str(l-total,4))
@17,35 say ltrim(str(t-mon,3))
@17,41 say ltrim(str(t-tues,3))
@17,47 say ltrim(str(t-wed,3))
@14,53 say ltrim(str(t-thur,3))
@14,59 say ltrim(str(t-fri,3))
@17,65 say ltrim(str(t-sat,3))
@17,71 say ltrim(str(t-total,4))
@20,35 say ltrim(str(p-mon,3))
@20,41 say ltrim(str(p-tues,3))
@20,47 say ltrim(str(p-wed,3))
@20,53 say ltrim(str(p-thur,3))
@20,59 say ltrim(str(p-fri,3))
@20,65 say ltrim(str(p-sat,3))
@20,71 say ltrim(str(p-total,3))
@23,3 SAY "COMPARE"
@23,13 SAY trim(str(twtot,4))
@23,17 SAY "TRADE HRS &"
@23,29 SAY ltrim(str(mwkdone,4))
@23,34 say "HRS OF ACTUAL WORKDONE"
@24,40 SAY "*==>> press any key to continue"
set console off
wait
set console on
clear
i=i+1
select 2
set color to BG+/W,N/G,R

```



```
endif  
enddo  
close all  
return
```

## PROGRAM FOR WEEKLY COST CONTROL SHEET \* \* \*

talk off

echo off

status on

delimitter on

escape on

escape exit

weeks

0 to mnumopr

color to RB

3 to 17,70 double

color to

10 say "ENTER THE TOTAL NUMBER OF ACTIVITY INVOLVED" get mnumopr picture "

color to B/W,R/N,G

while l&lt;= mnumopr

0 to mquant

0.00 to mtagrate

(15) to mopdex

0.00 to mlarate

0.00 to mtdrate

0.00 to mplrate

0.00 to mplcost

ctod(" / / ") to mdop

0.00 to mlacost

0.00 to mtrcost

0.00 to mactnum

while .t.

r

color to B/W,W/G,R

to 22,59 double

say "ENTER THE OPERATION NUMBER: " get mactnum pict "99999"

say "ENTER THE OPERATION DESCRIPTION:" get mopdex picture "@x!"

8 say "ENTER THE QUANTITY OF ITEM:" get mquant pict "9999999"

8 say "ENTER THE TARGET RATE : " get mtagrate picture "@B99999.99"

8 say "ENTER THE TRADE RATE : " get mtdrate picture "@9999.99"

8 say "ENTER THE LABOUR RATE: " get mlarate picture "@B99999.99"

8 say "ENTER THE PLANT RATE : " get mplrate picture "@B99999.99"

l

ar

lect A

top

ate for opno=mactnum .and. date\_op=mdop

found()

gral=mtagrate\*mquant

cost=mtdrate\*t\_total

cost= mlarate\*l\_total

cost = mplrate\*p\_total

rate = mplrate \*p\_total

tcost = mtrcost + mlacost +mpcost

tcost = mtocost +mlacost +mplrate

st = mtotcost/mquant

ect B

end blank

ace week\_no with A\_wkNo, opr\_no with mactma

ace opr\_dex with mopdex,quant with mquant

ace tag\_rate with mtagrate, tag\_ral with mtagral

ace ba\_trhr with bd\_la\_hr, A\_t\_total with A\_total

ace ba\_plhr with A\_p\_total,tr\_rate with mtdrate

ace la\_rate with mlarate,pl\_rate with mplrate

ace tr\_cot with mtcost,la\_cost with mlacost



```

ace pl_cot with mplcost,tot_cost with mtotcost
ace un_cost with muncost
r
color to B/G,R/W,BG+
to 23,77 double
say replicate("-",73)
say "WEEKLY COST CONTROL SHEET"
say "WEEK No:" +ltrim(str(week_70,3))
say "WEEK No:"
say "CONTRACT No: :"
say "OPERATION NUMBER:" +ltrim(str(OPR_NO,3))
36 say "OPERATION DESCRIPTION:" +TRIM(OPR_Dex)
5 say "quantity: " +trim(str(quantity,4))
23 say "TARGET RATE:" +ltrim(str(tag_VAL,12))
5 say "BASIC TRATE HRS:" +ltrim(str(tag_val,12))
31 Say "BASIC LABOUR HRS:" +ltrim(str(balahr_3))
57 say "BASIC PLANT HRS:" +ltrim(str(tr_rate,7))
5 say "TRADE RATE: " +ltrim(str(tr_rate,7))
30 say "LABOUR RATE: " +ltrim(str(la_rate,9))
55 say "PLANT RATE: " +ltrim(str(N_rate,9))
5 say "TRADE COST:" +ltrim(str(tr_cost,10))
29 say "LABOUR COST:" +ltrim(str(la_cost,11))
54 say "PLANT COST:" +ltrim(str(pl_cost,11))
15 say "TOTAL COST:" +ltrim(str(la_cost,11))
50 say "UNIT COST:" +ltrim(str(un_cost,8))
22 say "=>>press ANY key to continue ....."
console off

```

console on

r

r

t.

```

color to B/G,R/W,BG+
3 to 17,60 double
color to G/*
23 say "RECORDS NOT IN THE FILE!"
color to B/G,R/W,BG+
20 say "Do you want to try again (Y/N)?" get ta picture "@ A!"

```

a

ear

op

ear

f

f

o

l

o

ose all database

rn



[illegible]



CONTRACT

CONTRACT No.:

FOREMAN / OF IN CHARGE

TRADE

SHEET No.

HOURS

DATE

BLOCK No.

C OPERATIONS

NAME &

CLOCK No.

DAILY TOTAL

FOR OPERATIVE

STORAGES

[HOURS]

TOTALS

DAILY TOTALS FOR PLANT

OPERATING STANDARDS

TOTALS

REMARKS

WEATHER CONDITIONS

SIGNED

FOREMAN/OC

BLOCK NO ONLY APPLIES WHEN THIS FORM IS BEING USED FOR HOUSING.



# WEEKLY SUMMARY SHEET.

CONTRACT NO

WEEK NO

WEEK  
ENDING

BLOCK NO

SHEET NO OF

COMPILED BY

OPERATION :	DAY	M	T	W	TH	F	S	S	TOTAL
PLANT USED :	LAB. HRS								
	TRADE HRS								
	PLANT HRS								

OPERATION :	DAY	M	T	W	TH	F	S	S	TOTAL
PLANT USED :	LAB. HRS								
	TRADE HRS								
	PLANT HRS								

OPERATION :	DAY	M	T	W	TH	F	S	S	TOTAL
PLANT USED :	LAB. HRS								
	TRADE HRS								
	PLANT HRS								

OPERATION :	DAY	M	T	W	TH	F	S	S	TOTAL
PLANT USED :	LAB. HRS								
	TRADE HRS								
	PLANT HRS								

OPERATION :	DAY	M	T	W	TH	F	S	S	TOTAL
PLANT USED :	LAB. HRS								
	TRADE HRS								
	PLANT HRS								

OPERATION :	DAY	M	T	W	TH	F	S	S	TOTAL
PLANT USED :	LAB. HRS								
	TRADE HRS								
	PLANT HRS								

\* BLOCK NO ONLY APPLIES WHEN THIS FORM IS BEING  
USED FOR FLOWING.