COMPUTERISATION OF THE PROCESS OF COSTING A TDN, 11KV & 33KV TRANSMISSION LINE

A CASE STUDY OF NIGER STATE RURAL ELECTRIFICATION BOARD MINNA

BY

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CERTIFICATION

This project entitled "Computerisation of the of costing a TDN, 11KV & 33KV Transmitting Line" by Labbo M. Yusuf, of department of Maths, Computer sciences, Reg. No. PGD/MCS/104/1996, meet the regulation governing the award of a post graduate Diploma in Computer science of the Federal University of technology, Minna and it approved for its contribution to knowledge and literary presentation.

Name……………………………..   Date………………..

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Signature………………………..

    (Dean post graduate school)

DEDICATION

I dedicate this work to my wife RAKIYATU and my children Ummi Balkis and Baby Zeenat, I love you all .

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ACKNOWLEDGMENT

ABSTRACT

It is an established fact that the wind of Information Technology has cut across all fields of endeavour. It therefore becomes a challenge to all departments to look inward with a view to discover how it can benefit from this global phenomenon.

This project work is a product of such good thinking, The writer works in an organisation whose primary occupation is to construct electricity transmission line i.e. (11kv, 33kv, ITC & TDN). In such a contractual assignment a lot of paper works are involved, the activities include estimation of project works, tendering, vetting of tender, monitoring of the job, procurement of materials, stock requisition and issuing, and general project monitoring.

The Software developed in this project work is intended to be used in a transmission line construction industry with particular reference to Niger State Rural Electricity Board Minna.

CHAPTER ONE

1.0. INTRODUCTION

In this opening chapter attempt will be made to highlight the function performed by the organisation whose activities requires the automation process, key functional parameters (like tendering, variation, ITC, TDN, etc.), as relate to the process shall also be explained. In view of this literature review shall be presented on what a Computer is, what it is capable of doing , how to handle Computer hardware and Software, the language the computer understand among other things. The feasibility study shall be carried out on the proposed topic, alternative solutions shall be presented which will over come the deficiency discovered in the existing procedure.

1.1.0. HISTORY OF THE ORGANISATION.

Niger state rural electricity Board came into being in the year 1976, it was created out of the defunct North Western State Rural electricity Board Sokoto (When Niger State was created).

The highest governing body of the organisation is the Board of directors of NSREB, while the day to day management body consist of the principal officers like the office of the General Manager, AGMA, AGME, Construction Manager, Manager planning and Monitoring.

Niger State rural electricity Board is charged with the responsibility of setting up Rural electricity scheme for the rural community in Niger State, and also connecting such Town and Villages that are close and connectable to the National grid. A challenging task of connecting all the Local government headquarters is a government policy that the Board must achieve.

The major financier of the projects carried out by the board is the government of Niger State, some time too assistance are drawn from the Federal government of Nigeria. The government also encourage communities to embark upon self help projects, such efforts are often complimented by the government.

The organisation is made up of the following functional departments :

- Construction department
- Planning and monitoring department
- Personnel department
- Accounts and store department

The area of concern to this project work are the Constructions, Planning/Monitoring

Department. By this it is required that a Data based be created where several report can be

generated for projects management purposes.

1.2. FUNCTIONS PERFORMED BY THE ORGANISATION

In this subsection a detail description of the activities performed by the organisation is given.

this can be summarise as follows:

- Construction and maintenance of electricity supply system for a rural settlement.
- Construction of TDN work connectable to national grid
- Construction of ITC work that facilitate the connectivity of the TDN.
- The board also perform the following functions.
    It can represent the Government of Niger state in negotiating with a contractor over an

    Electrification job of Government interest.

    It can also offer its services to any other interested members of the public and corporate

    bodies.   ٧.

    work.

In each of the cases stated above, some processes are involved, and these processes need not to be

explained as they will form the base by which computation will be analysed.

1.3.0. STATUTORY REGULATIONS

It is pertinent to understand at this beginning that the project for which computerisation is

required must complied with the following Statutory regulatory bodies.

- Factory act regulation of Nigeria 1937
- I.E.E. regulation 16th edition
- The factory act 1961
- The laws of federation of Nigeria chapter 58
- Standard electrical specification for FRN 1971
- National electrical power authorities decree 1971

1.3.1. TENDER BOARD

The tender board which sometime double as the project implementation committee is set up by the government to call for tender, carry out tender vetting and are also charged with monitoring progress of the work from start to finished.

1.3.2 TENDERING

Tendering comes up after the implementation committee has meet and have agreed on the feasibility of the project. the Rural electricity board could on behalf of Niger state government call for submission of tender from reputable contractors to undertake a particular project. The information on tender notice will include the following: Scope of the tender, method of tendering, submission of tender and tender evaluation.

1.3.3. GENERAL CONDITION OF CONTRACT

This is a literature that goes along with tender document, it describes general conditions that guides the contract work. It gives both the contractor and the client the limits at which each should operate. the conditions are agreeable in law, any of the party has the right to claim damages in cases of breach of conditions of agreement. A similar condition but much more related to a particular application can also be included, this is called 'condition for a particular application.

1.4 TDN WORK

The term TDN connotes Township distribution network. It can be explain to mean the system whereby components are put together for the purpose of extending Electricity supply to domestic and industrial installations of the town under consideration. The major components require for this construction include; aluminium conductor, poles, wooden cross arm, channel iron, D-iron, etc.

A TDN work can be a prepared work to be connected to the National grid or it can be a stand alone project whereby a power generator need to feed the system, In this case a fairly large generator need to feed the system .The generator are supported by the power transformers. A TDN can double as a low tension network and an Lv/Hv system along side.

1.4.1 ITC WORK

The ITC is the term used for inter-township connection work. It is the construction work require to link a town already enjoying the national grid to the town under consideration, for this purpose higher rated transformers are necessary and there is need to create main substation and other substation at substation distribution point. to undertake an ITC work the following major impute are required: pole support, cross arm, channel iron, pot insulators Aluminium conductor, gang isolator, step up and step down transformers.

1.5.0   COSTING OF RURAL ELECTRIFICATION PROJECT

This is an essential part of the function performed by REB Minna, infact to emphasise on its relevancy a department is dedicated for that purpose. The term costing can be interchanged with estimation. they are all used for calculating the monetary value for a job under consideration.

Estimation can be defined as the process by which cost computation of a particular project is carried out, it can be for entire scheme in order to establish the over all cost of the construction work or sub -contract work or for cost comparison of an alternative design as done at cost planning stages. It can also be undertaken by the Engineer as a means of checking a tender to be received or can be undertaken by the estimator in the firm for the purpose of submitting a tender. In conclusion it can serve as a means of establishing the cost of any measurable variation during the construction period of a project.

PRINCIPLE OF ESTIMATION / COSTING

For a tenable costing of a project to be evolved , the following step need to be taken seriously by the estimator.

1. He should study the specification thoroughly.
2. He must have a knowledge of site conditions.
3. He must have knowledge of the construction work.
4. He must be able to measure qualities of materials from the drawing using scale rule.
5. He must be able to tell the time required to complete various operation involved in the project.

1.6.0 RURAL ELECTRIFICATION

The concept rural electrification connote a process of :

1. Extending an existing step down National grid to a rural settlement, thereby encouraging rural areas dwelling and hence de-congesting the city.

2. An option of installing a Diesel engine is necessary where National grid is not close to the village under consideration, in this option a medium size diesel engine power generator is usually installed to give power to the rural settlement.

1.6.1. NATIONAL GRID

This is a Network system of electricity transmission all over the Nation, the system is such that several power generating station feed their power on the National grid so that the grid is centrally controlled. It is from this National grid that several step down sub-station are made at suitable points. National grid is on an extra high voltage which makes it difficult for indiscriminate step down. All the same, a single step down can go to several kilometre to feed other inland towns and villages.

1.7.0. COMPUTER SYSTEM

Before defining the **computer system**, let us first describe what a **computer** is, Computer is an electronics device that is capable of accepting data (input) processing the data, and producing information (output) fastly, accurately, and thus more efficiently than human efforts.
Therefore a computer system is made up of the user, the hardware, and the software and has a goal of solving problems for the user .

1.7.1 HARDWARE

Hardware are the physical components and devices which make up the computer system, when one enters a computer room, The physical parts of the computer that is feasible are the hardware. A list will give an insight : diskettes, keyboard, system unit, printers, and the monitor, etc.

1.7.2 SOFT WARE

Software are basically programs, these simply consist of sequence of instructions needed to be performed to accomplish a task. It is the software that enables the hardware to be put into effective use.

Three types of software are used in a computer namely:

- system software
- application software (purchased or locally developed)
- utility software

The objective of this project work is to develop an home made package for a particular application.

1.7.3   CLASSIFICATION OF COMPUTER SYSTEM

computer comes in wide variety of sizes ,ranging from tiny hand-held devices to some that are several feets in height and diameters. over the years computer have become smaller and smaller but they also become increasingly powerful, Computer can be classified by the way they process data and by their size. Some classification are listed below:

classification by size

♦ Super Computer
♦ Main frame Computer
♦ Mini Computer
♦ Micro Computer

Classification of Computer by logic gives the following:-

♦ Analogue Computer
♦ Digital Computer
♦ Hybrid Computer

For our purpose a general purpose Micro Computer will do.

1.7.4.   DATABASE MANAGEMENT SYSTEM

In Computer science a database management system (DBMS) is a soft ware that construct, expand and maintain the data contained in data base. It provide the interface between the user and the data in such a way that it enable the user to record, organise, select, summaries, extract, report on and other wise manage data contained in a data base.

Dbase IV

The Dbase IV is a "language" used in the Dbase environment, with a dbase IV it is possible to create a database modify an existing one, edict, sort, record, extract and manipulate data stored in a database. Dbase IV shall be use to create a database for this project work.

1.8. CLASSIFICATION AND UNDERSTANDING THE PROJECT REQUEST

After taking a few definitions , the work will continue by making some enquiries on how the existing procedure is operated, and this informed the project request. In order to get the true picture of the project request therefore three group of people were interviewed these are :-

i. The manager

ii. The users of the system

iii. The programmer

The manager was quizzed being the person responsible for running the organisation, The users were interviewed because at the end they will be custodian of the system while the programmer remain a very important personality in the life of system development.

The following information sources were visited.

1. The user of the system.

2. Forms and document used in the organisation.

3. Procedure manuals which specify how various activities are carried out in the organisation.

4. Various reports used in the organisation.

1.8.1. METHOD OF SEARCHING FOR INFORMATION.

The interview techniques was used even though other techniques were also applicable (e.g. questionnaire National Statistics, observation e.t.c.) and the aforementioned group were duly interviewed.

THE DEDUCTION FROM THE INFORMATION GATHERED.

The following are the findings arising from the information gathered and this also forms the project request:-

a. That the existing manual method of planning the construction work for ITC and TDN is slow.

b. That the process of estimation is repetitive for each project.

c. That the volume of work in estimation makes it cumbersome.

d. Excessive cost of preparation of Bill of quantity.

e. That the printed documents obtained from it is less fanciful.

f. That the fluctuation in material cost disrupts the process.

1.8.3. THE STATEMENT OF REQUEST.

A statement of request was therefore put forward thus "Haven found out the above mention deficiencies in the project planning process, it will be desirable if you can examine the possibility of computerisation of the costing process of 11KV, 33KV and TDN work".

1.9. DETERMINATION OF ALTERNATIVE SOLUTION.

These phase prepare the ground for the feasibility analysis (or feasibility studies), already deficiency has been pointed in the existing manual process, It is now proper to suggest alternative solution to make remedy on the deficiencies. Here we shall present two alternatives and thus make a choice out of the two.

1.9.1. SUGGESTION No. 1

a. Changing from the present use of typewriter to electrical operated typewriter, this will improved the legibility of the printed documents.

b. Design a standard form for the estimation process and then print several copies of it. This will reduce the labour of "format making" each time an estimate is to be done.

c. Employ an extra clerical store checker whose job will be to cross-check the store inventory record submitted by the store keeper, this will reduce errors in store entries.

d. To make allowance for fluctuation in market price each time an estimate is made.

e. Let the department of planning, costing and estimate further be splitted into two so that costing will have a section of its own.

1.9.2. SUGGESTION No. 2.

Introduction of computerisation into the department of planning, monitoring and costing. This will entail:-

a. Creation of database to store all datas that borders with materials.

b. Computerise the process of store issues and control.

c. Writing a program that enable the user carry out all sort of manipulation on project monitoring.

d. Procurement of photocopier to ease duplication of printed materials if necessary.

1.10. FEASIBILITY ANALYSIS.

Two suggestion has been offered above. The task will now be that of evaluating each of the alternatives with a view to finding how feasible they are, To do this we shall use the following instrument of feasibility analysis:- i.e we will check :

i. Their technical feasibility; by this it is meant to ask whether the technology requires is available, and if available whether it is use-able.

ii. Their operational feasibility, Here it means to ask whether the proposed system can fit in with the existing operation.

iii. Their economic feasibility; To ask whether finances are available for implementing the proposed solution and whether the money spent is recovered by the savings or by user's satisfaction.

EVALUATING SUGGESTION NUMBER ONE

We shall now carry-out the three arms of the feasibility on suggestion no. 1:

a. **The technical feasibility:** A market survey of equipment's involved in this option was Made, Discussions were also carried out with the managers of the organisation , at the end it was discovered that the technology for this option is available and useable. operational feasibility study carried -out on option 1 reveals that the equipments suggested in this option can easily be incorporated into the existing process.

b **economic feasibility:** In order to obtain a good result of this studies a notion called cost/benefit analysis is necessary. A cost-benefit analysis is necessary to determine economic feasibility. The primary objective of cost/benefit analysis is to find -out whether it is economically worthwhile to invest in the option . if the return on the investment is good, the project is considered economically worthwhile.

DIRECT COST.

Electric typewriter

Rank- Xerox photo copier

Salary of store checker per annum

DIRECT BENEFIT

- saving per month due to stationery reduction and wastage is 50%
- efficiency can be improved to 70%

INDIRECT BENEFIT

- This will reduce the work load per worker in the department.
- It gives the top executives in the department sufficient time to attend to other serious issues.

EVALUATING SUGGESTION NUMBER 2

Let us now carry out the three arms of the feasibility on this option ;

a) **Technical feasibility:** the designer of the system made a market survey on the equipments and found the equipment available and adaptable, it can there be concluded that the technology involve in this option is available and usable.

b) **Operational feasibility** : observation has shown that the current members of staff (users) can be trained to handle perfectly the equipment suggested in option 2. More so, it has been discovered that such equipment can be incorporated into the existing process.

Economic feasibility: As was done for option one use shall be made of cost / benefit analysis.

Direct cost:

- Cost of a personal computer.
- Cost of a Voltage regulator.
- Cost loser jet printer.
- Cost of computer room preparation (refurbishing)
- To Employ a system analyst for at least one year.
- Training of 2 members of staff.
- Stationary, floppy disc, maintenance, Electricity .

- Capital cost.
- Recurring cost.

BENEFIT (DIRECT & INDIRECT BENEFIT)

- Staff strengths will be reduced by ¾ , thereby saving cost.
- Volume of work will be reduced to the bearest minimum.
- Stationery demand drops to about 10% of the usual demand.
- Efficiency of 95% can be achieved.

FEASIBILITY REPORT

From the feasibility study carried out, suggestion number one was good on its own, being that (as was shown above) It could improve the efficiency up to 70%, and also reduce volume of work, stationery demand was also reduced. But a second look at suggestion number two shows that a better result can be obtained from it: A 95% efficiency , a higher reduction in stationery e.t.c.

FEED BACK

The feasibility report was presented to the project implementation committee of the firm and the following is their feedback: "A careful study and deliberation of the report presented by the analyst convinced us that option no 2 will be better for us when it is compared with option no. 1 .The analyst can go ahead to design ,implement and install the system of option no 2."

CHAPTER TWO

2.0 SYSTEM ANALYSIS

In system analysis, the analyst will make a thorough study of the existing procedure, he will make assessment of all details and facts in order to discover if there is problem with the system. In order to design a better information system the analyst will request the user to state his requirements. he will now examine how the requirement are met in the existing system and also suggest how to make it better.

Therefore the first thing that will be considered in this work is to examine the user's stated requirement. This will be followed by assessment of the existent procedure. That will then also be followed by the new system specification.

2.1.0 STATEMENT OF REQUIREMENT

The statement of requirement which was given in chapter one will now be summarised for the purpose of analysis. An organisation charged with the responsibility of rural electrification wishes to computerised part of the organisation activities. The unit selected are namely, Monitoring, Stores, Audit inspection and by implication, Accounts unit. The existing procedure is that; when a Job is to be carried out, the monitoring unit will prepare an estimate, this is subject to approval , and when it is eventually approved an order will be placed for a contractor to supply the items. The items supplied by the contractor will first of all pass through the inspecting audit, This unit will accept the good ones and reject the bad items, The good items will be delivered to the stores. The store will duly inform the account department for the payment to be effected to the contractor. The planing and monitoring unit will however monitor all the procedure stated above.

2.2.0   A STUDY OF THE PROCEDURE

The transaction between the Audit and Account department are more or less documentation flow of information, however the action in the store office and monitoring office involved some computation and management of data, therefore the process of estimation will be explained here.

ESTIMATION

Estimation is the process by which cost computation of a particular project is carried out, it can be for entire scheme in order to establish the overall cost of the construction work or sub-contract work, or for cost comparison of alternatives as done at cost planing stages. it can also be undertaken as a means of checking tender to be received or can be undertaken by an estimator for the purpose of submitting a tender.

2.3.0   PRINCIPLE OF ESTIMATION

In the existing manual procedure estimation is carried out using the following steps;

a) A study of specifications on the briefs.

b) A knowledge of construction works (TDN and ITC).

c) A knowledge of site condition.

d) Measurement of the quantity of material required from the drawings.

e) A knowledge of the time requirement to complete various operations.

f) A knowledge of statutory requirement CP and I.E.E regulation etc.

2.3.1   <u>METHOD OF ESTIMATION</u>

There are three methods used in estimating rural electrification work. These are explained below.

a)   **Per kilometre;** In this method it is expected that the Engineer has calculated the amount required to construct one kilometre , It therefore follows that to estimate for a certain amount of kilometres then one must multiply the per kilometre cost by the no of kilometres. To obtained the per kilometre cost one must have taken into consideration the item, price, quantity required, cost of delivery and installing, special charges and overhead cost.

<u>Example</u>

If the estimator has arrived at per kilometre cost of an ITC work to be

-N-100.000 , Therefore the cost of constructing 10km of ITC will be -N- 1m .

(i.e.10 x 100,000). This method is suitable only for preliminary estimation of a project.

b).   <u>**Percentage of labour charge.**</u>

In this method the quantity of each item is described and also the unit cost (rate) of each item is specified. The Amount for each item is given by **Qty x Rate**. For a specified number of item the total cost will be the sum of all amounts. The labour charge now follows: The labour charges is taken at between 10%-20% of the total sum.

<u>Example</u>

3 Items are to be supplied, deliver, & install by a contractor, the bill of quantity is as follows

Items A;   Qty   =   2

            Rate   =   N 20   (for supply & deliver to site)

            Amount   =   20 x 2 =   =N=40

| | Amount | = | 20 x 2 = | =N=40 |

Item   B;   Qty   =   3

| | Rate | = | N 30 |

| | Amount | = | 30 x 2 = | =N=6 |

Item C;   Qty   =   4

| | Rate | = | =N=40 |

| | Amount | = | 40 x 2 = | =N=80 |

Total   =   40 + 60 + 80   =   =N=180

Therefore Labour Charge   = 10 % of Total

=   =N= 18

Grand total will therefore become   N 180 + 18 =N198

2.4.0   **FORM DESIGN**

A form is designed to accommodate all the variables thereby making the calculations much easier, this is shown below:

S/NO	ITEM	UNIT	QTY	RATE		AMOUNT	
				=N= K		=N= K	
1	Item A	NO	2	20 : 00		40 : 00	
2	Item B	NO	3	30 : 00		60 : 00	
3	Item C	NO	4	40 : 00		80 : 00	
				TOTAL		180 :00	

Labour charge = 10% of total =   =N =18

Grand Total   = 180 + 18 = =N= 198.00

In this method of estimation, labour (i.e. cost of installation) is charged side by side for each item described. The amount in this case will be a direct multiplication of **Qty x Rate x cost** of installation. The total sum for all the items under consideration will be the sum of all Amounts

$$\text{Total} = \Sigma (\text{ Amount })$$

OTHER OPERATIONS

The other operations carried out in the monitoring unit include

> Raising Variations
>
> Producing Report
>
> Cordinating activities in stores units
>
> Preparation of tender documents
>
> Storage of files of previous works

Variations: Variations involves the re-valuation of contract sum as a result of increase in prices of item or when an Engineer decide to co-opt an additional work into original approved estimate.

2.5.0   ASSESSMENT OF EXISTING MANUAL PROCEDURES

In consonant with the established method ,of analysis the existing procedure is now subjected to criticism; a thorough investigation on this has shown that:

The existing process of achieving the departmental objective is expensive

The calculation is tedious

That the speed is low

That the procedure is unnecessarily repetitive.

A questionnaire set up to investigate this fact gives the following revelations:

QUSTIONS: Why was the present methods adopted.

Answer - The clerical method is adapted because it was the only option available before the advent of computer in this part of the world.

Question: What are the effects of the problem.

Answer: It has been observed that files for previous jobs are sometimes found missing, In other cases the store keeper do loose count of his inventory; calculating often becomes tedious, volume of document to be produced is often enormous, apart from these the efficiency of the manual system is nothing to write home about.

Question: What is the alternative method ?

Answer: Two alternative methods were proposed out of which one was favoured based on merits. The favoured one was the automation of process of estimation of 33kv, 11kv and TDN work.

Question: What are the significant of the proposed solution ?

Answer: When fully developed, it is expected that the new system will eradicate most of the deficiencies observed in the existing process.

Question: Who should be contacted for relevant information that will be useful in evolving a new system ?

Answer: The General Manager of the board and the Manager Constructions should be able to give a first hand information on what is required. Manager Planning and Monitoring is also relevant(being the head if the estimation and monitoring team). The Staff of account, stores, Audit and monitoring should also be questioned since they will be the end user of the proposed system. And truly the relevant persons were duly interviewed.

Question: What does the users feel is the solution to the problems discovered

Answer: An extensive discussion with the user reveals that the majority of the user department will prefer the computerisation of the existing process.

2.6.0   <u>REQUIREMENT SPECIFICATION</u>

It can be recalled that in the opening of this chapter, it was stated that the first step towards

system analysis is to look inwards at the existing process and thus investigate the presence and

the cause of a problem if it ever exist and from where a new system could be analysed. The

next step towards this analysis is to make a requirement specification, in order to do this the

approach of **V. Rajaraman** is followed. He stated inter-alia that " In order to design an

information system, the analyst requests the user to state his requirements, he also finds out

how they are met (may be partially) in the current system. Normally, user's statement of

requirements is descriptive and not precise. Furthermore, many points are not explicitly stated

by the user. A systems analyst should also try to find out whether he has understood fully the

user's statements. He must therefore use a method that will enable him to precisely inform the

user his understanding of the requirements, he will then move to the requirement determination

and new system's activities," the figure below enumerate the things to do in order to make an

acceptable specification.
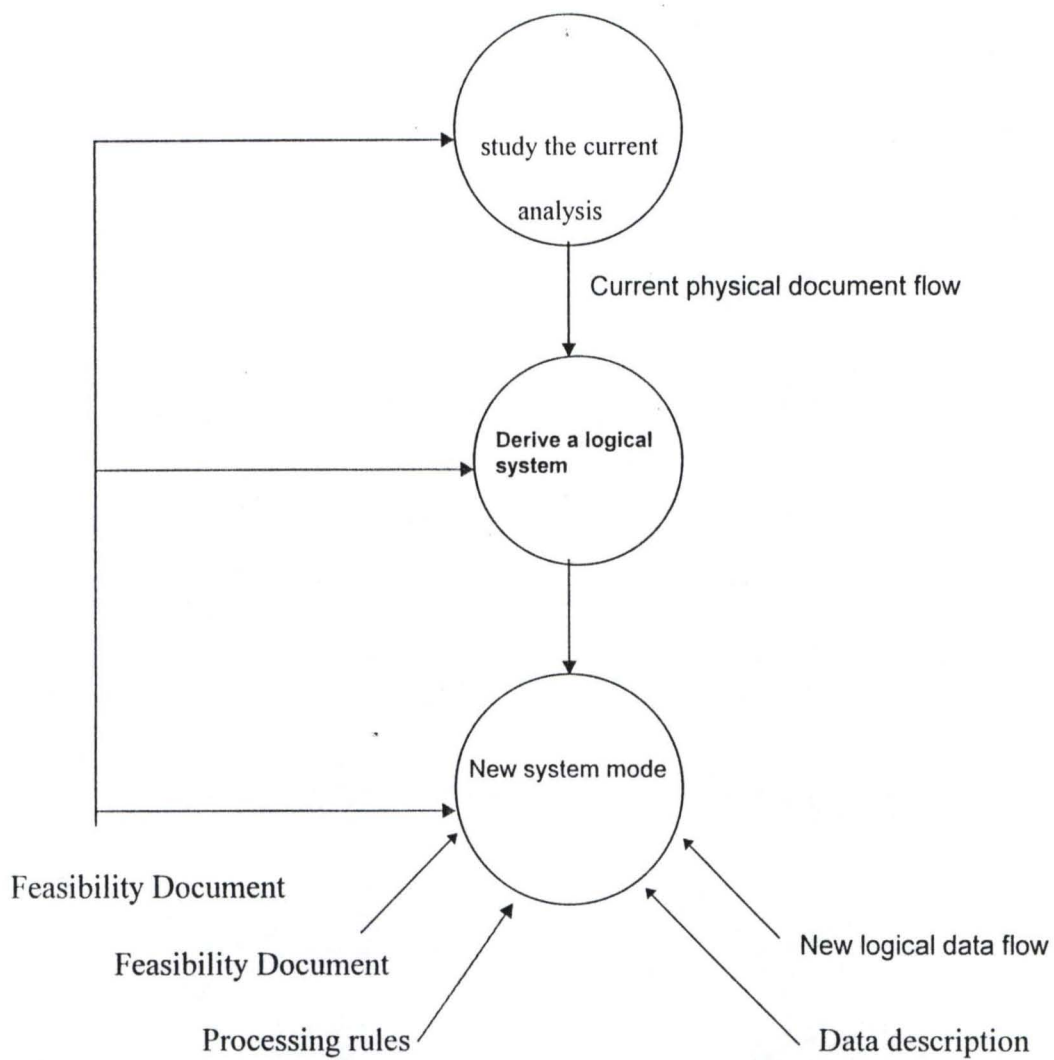
fig 2.1   requirement specification

The analyst is having the following tools at his disposal to assist him in making a specifications;

Modularization of the structure

Physical document flow diagram

Data flow diagram

Structure English

Decision table

Data dictionary formation

These tools shall now be applied to the problem at hand .

2.7.0 <u>MODULARIZATION</u>

Modularization simply refers to a system of dividing a large problem into smaller one and then solving the problem bit by bit, It makes the problem solving easier. In the case under review documents are assumed to flow through the following offices, while the physical items pass through only a few of them. The offices are:

Contractor's

Monitoring Office

Inspection Audit

Store Office

Account Office

The system modules will thus recognise such offices.

2.8.0 <u>Physical Document Flow</u>:

Before any analysis can be done on a system, The physical documents flow in that organisation must be recognised. This will form a base for the analysis. More often this flow is represented by a sketch and as such relevant information's are deduced from the sketch. See fig below.
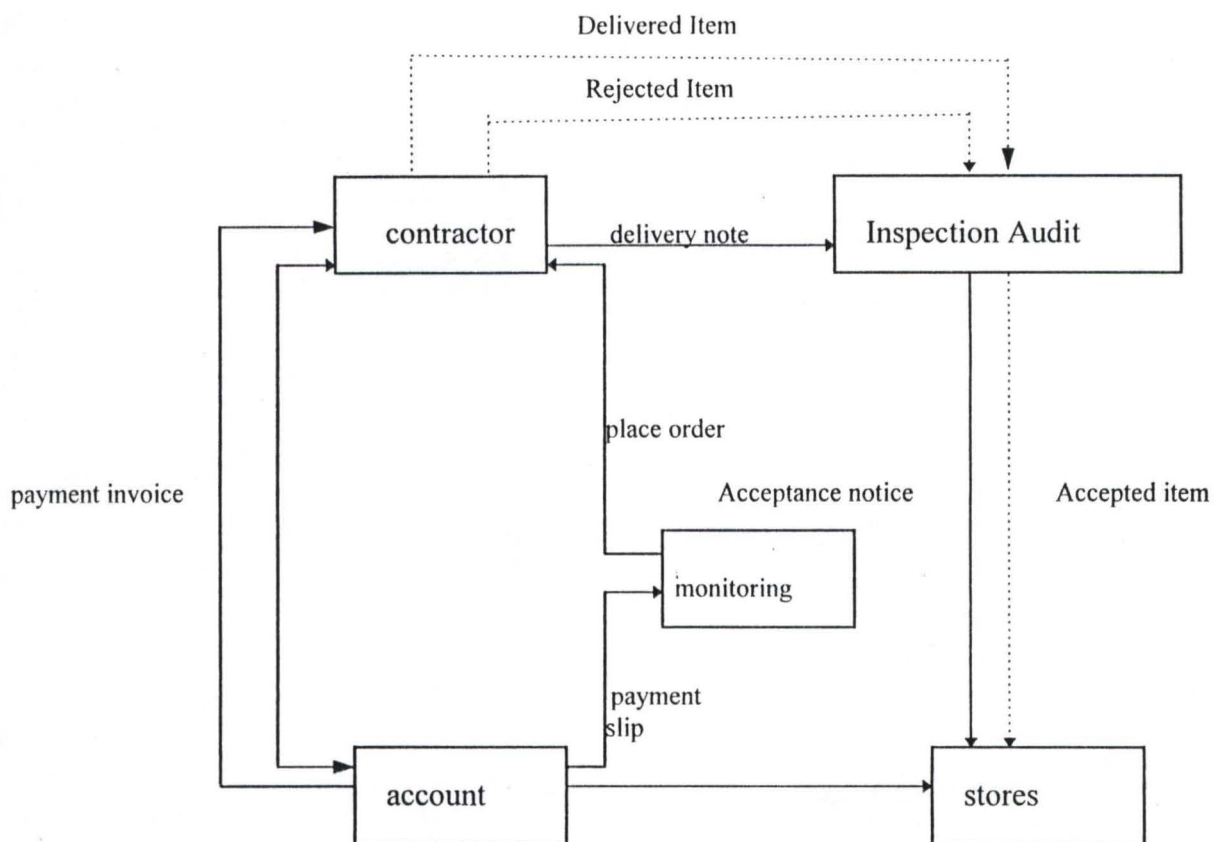
fig 2.2 physical documents flow diagram

Interpretation

From the document flow diagram shown above, it is possible now to deduct the major

information that flows from one office to the other, this will lead us to the determination of

logical flow of data.

The three categories of information required depend on managerial level. This are as follows;

Operational requirement

Tactical requirement

Strategic requirement

Operational requirement

This type of information is needed for day to day operation of a business organisation

In this case operational requirements are;

List of item requires for a job

List of item accepted

List of item rejected

List of item used already

Total cost of a contract sum

current price of items.

Tactical requirement

This type of information is needed to take short range decisions to run business efficiently.

In this case the strategic information required are:

> Identify item whose price has increase
> Volume of inventory at hand
> Determine optimal level of inventory
> Cross check payment made to contractor
> Planning order
> Stop order

strategic requirement

This is the information needed for long range planning and directing the course the business

should take.In this case the strategic information requirements are:

Cross check job performance
Consider re-valuation of contract
Monitor the payment scheme to contractor
Evaluate contractor's performance index

2.9.0   DATA FLOW DIAGRAM

Data flow analysis is the next stage after the document flows analysis has been made. The information derived from the document flow is now used to draw the data flow. This depict what data are required for processing and from who the data emanates, when properly analysed, this will form the bases by which a data dictionary is formed.The data flow diagram I is given below:
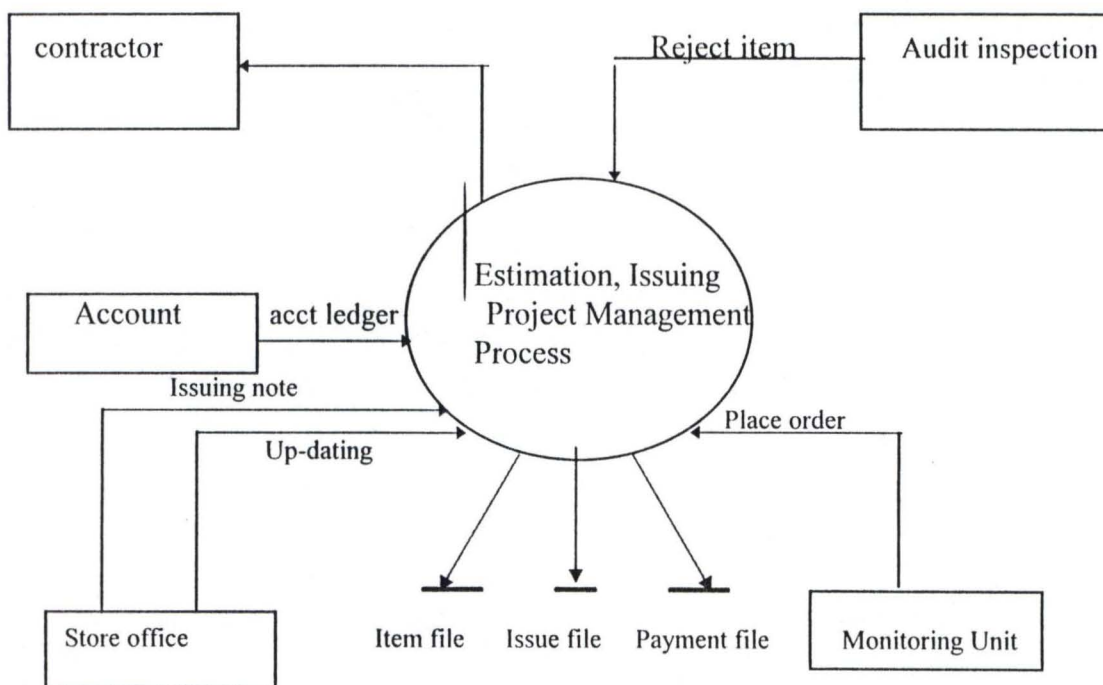
fig 2.   Data flow diagram

2.9.1   FORMATION OF DATA FLOW DIAGRAM

1 The rectangle box represents the individual that requires an information or give same.

2 The lines with the arrow shows what data flows in what direction.

3   The centre circle depicts the processes required to be carried out on the data in order to produce the required information.

4 The straight line with a slash underneath denotes a file. This stores information or data, m some of the file has a dual arrow this is a bi-directional flow of data.

Interpretation of data flow diagram

The Estimator (Monitoring Staff) will call for the item list file, he will make the necessary data entry. The program will be run. The input will be an information necessary to place an order.. The contractor so short-listed will deliver the items to the Audit inspections office, this office will accept the good items and reject the bad ones. The good items are finally delivered to the main store. The store officer will create a file to enable him monitor the issuing procedure, he will up-date his record as he issues and receives, he will also watch inventory level. The Account department is charged with the responsibility of paying the contractor as at when due and also maintaining the ledger as relate to the supply of the item. The ledger is up-dated after each transaction.

The data flow diagram can now be used to produce a decision tree or structure English depending on choice.

However, in this project the structure English approach is considered.

2.10.0   STRUCTURED ENGLISH

The data-flow diagram gives a brief description of the processes required to process data on each line, for a more detailed description of the process description we use Structure English or Decision tree.Structure English tries to express   verbal statements in a more logical frame work.

It uses natural language along with ideas of logic and block structuring used in a computer language such as Pascal. This makes the description more precise and understandable. Such a technique is useful if there are not too many conditions to be checked and the procedure are basically repetitive.

Structure English differs from the real software development, but it aids a non professional to understand the process as it is presented in simple English. It therefore serves as a part of the system's document.

The Structure English is hereby present for three of the modules namely Data Entry, Up-dating and Data deletion.

a) **Structured English for Data Entry**

{ set off talks, Echo, e.t.c.}

{ format your screen}

while there is item in the file Do

    for each item considered

      Read in (Unit, Qty, Rate) ·

      Amount = Rate * Quantity

      Write Amount

    End for

End while

b) **Structured English for Inventory up-date**

{ Set off talk, Echo e.t.c}

for each item entered Do

search inventory file using item code

for each item entered Do

search inventory file using item code

if successful then update the retrieved inventory record

Qty in stock = Qty in stock + Qty entered

New Qty in stock replaced

Write updated record and stop

 Else

create new record in inventory file

Enter accepted item and stop

End if

End for

C) **Structure English for Data Deletion**

{ Set talk, echo off e.t.c }

{ format your screen }

while there is item in the file Do

search for the record to be deleted

if search fails then write record not found

else

carry-out the deletion

end if

{ To continue , YES or NO }

if choice is YES

Go over the loop again

Else

Stop and Exit

Endif

Endwhile.

2.12   **DATA DICTIONARY**

The data dictionary is the collection of all data element involved in the system to be designed,

Each unit is carefully scrutinised for this, To do this the analyst will ask such question as; what

data elements are required to meet the information needs of this system and what are the data

element that are required at the input documents?

The following are the data elements for this system, a description of the data

is also given.

S/No	Name	Type	Width
1	Item name	Character	10
2	Item code	Numeric	8
3	Unit	Numeric	5
4	Quantity	Numeric	8
5	Rate	Numeric	8
6	Amount	Numeric	8
7	Labour charge	Numeric	8
8	Total	Numeric	10
9	Grant total	Numeric	10
10	Officer's name	Character	15

Program - style and language: The program style found adaptable to this system is modular

programming with this every facility provided in the system was written in modules making it

possible to modify. The language of choice as stated earlier is dbase IV, this is chosen because

of its versatility on most computer and because it offers enough facilities to develop this

system.

CHAPTER THREE

SYSTEM DESIGN AND SOFTWARE DEVELOPMENT

3.00 Introduction

In this chapter, the analyst will make use of the result obtained from the analysis presented in chapter two, which essentially is a requirement specification, and this will be used to produce a 'system specification'. The system specification consists of the design elements, which are used to design the system. Other factor considered in the design stage are the entity-relations, coding techniques, the control, auditing and security as it applies to the design of the system. After all this, the relevant flow diagram will be drawn and software will be written in the dbase IV language.

3.01 Design Element

When designing a system attention should be concentrated on the following elements of the design;

> Input design
> Output design
> File design
> Procedure

Other factors that should be considered are the time required to develop the system, the plan for the design, plan for changeover, the language to use in developing the system etc. each of this elements will be highlighted in this system.

3.02 System design

It can be recalled that in chapter two, the system analysis led us to 'Data flow analysis' this led us to Data dictionary. Here in system design we shall make use of the Data Dictionary to form the database. This will be done in stages; firstly, the

item in the dictionary list will be coded, secondly the coded list will be arranged to form an entity-relation model, this will help us to identify the relationship between specified entities. The items are then arranged to form tables in a process called normalization. The table can go through a refining process of 2nd, 3rd, & 4th normalisation. Eventually a conceptual mode of data will be obtained which will lead us to the formation of the physical database model.

3.03 Objectives of System Design

Perhaps the most important reason why a database must be properly designed is to reduce duplication of data in the base. Other reasons adduced include the need to simplify functions like sorting, deleting, updating etc. when a system is properly designed, it becomes relatively easy to write the system's software in modules.

3.04 Coding Techniques

Coding is an essential aspect of the design, there are quite a number of reasons why the key-field of a record of a database has to be coded, and some of the reasons include:

> To allow for easy identification of records
>
> To ensure easy cross-referencing
>
> To make provisions for efficient storage retrieval system

A few of the techniques used for this are: serial coding, Block coding, and group classification coding.

In this work the serial coding was found most suitable, in which each item described was given a code in serial number, with this unique code it becomes easy to carry-out sorting and other functions.

3.05 Entity-Relations Model.

Entity relation is a stage in the design that suggest the manner by which table of data will be arranged in a database. It helps to design a relational database, (A relational database consist of a collection of a relations relevance for a particular application) the entity-relation model is given in terms of diagrams. To construct an E-R diagram three aspect of the E-R must be specified namely;

> Entity
>
> Relation

Entities: These are the real world items in an application with these we mean the key individual and things in the set-up which helps the transaction. A simple example is this: The store-man issues out some items; here the entities are the store man and the items. Entities are also called records.

Relations: This specifies the connectivity between the entities, for example, in the given example above the connectivity between the store-man and items is the act of issuing, the relations is verb-like in behaviour.

Attributes: This is used to specify the properties of both entity and relationship separately and collectively. In the same example the property of the store-man may include his name, code, nomenclature etc.

The E-R model is specified using a simple diagram consisting of rectangles and diamond signs, side-notes are also made beside the boxes to denote the attributes.

For this project work the following are the entities:

Estimator

Items

Store-man

Contractor

Accountant

Engineer

Each of the entities above has its attributes.

a)   **Estimator**

| Estimator | {Estimator name, code, job title} |

Places Order   {Order no, code, date, item name, estimator name, code}

| Items | {Item name, code, order date, qty ordered} |

b)   **Contractor**

```
┌──────────────┐
│  Contractor  │        {Contractor name, code, job tittle, order no}
└──────┬───────┘
       │
       │
     ◇─────◇
    ╱ Supplies ╲        {Contractor code, order no, qty supplied, Item code}
     ◇─────◇
       │
       │
┌──────┴───────┐
│    Item      │        {Item name, code, qty supplied, date of supply}
└──────────────┘
```
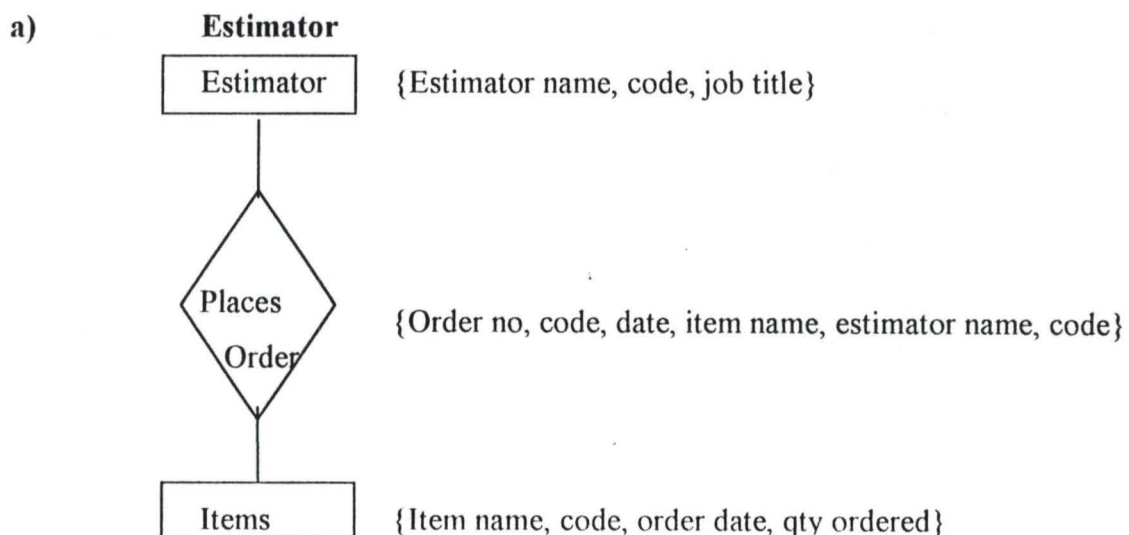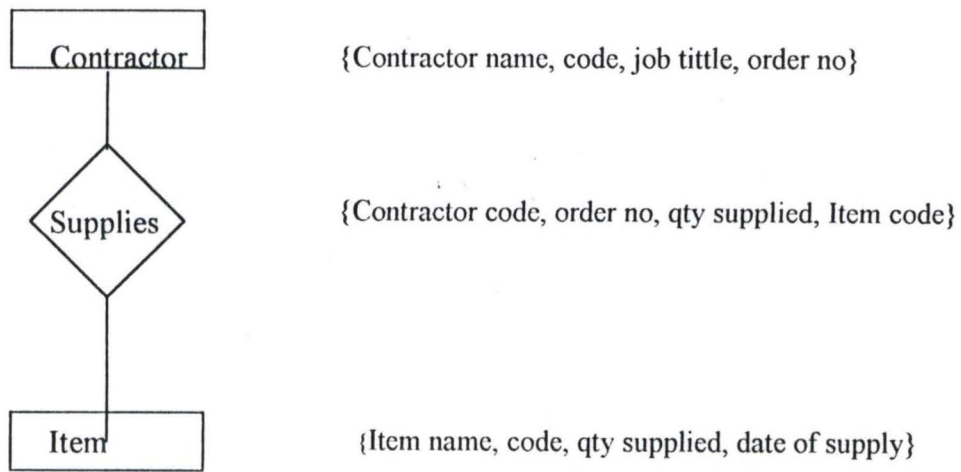
Fig 3.1 b E-R diagrams for supply of items.

c)   **Stores**

```
┌──────────────┐
│  Storeman    │        Storeman's name, code, Date of issue.
└──────┬───────┘
       │
       │
      ╱◇╲
     ╱    ╲
    ◇ Issue ◇            {Receiver's code name, qty issue' Storeman's name,
     ╲ out ╱             code, date of issue.}
      ╲◇╱
       │
       │
┌──────┴───────┐
│   Items      │        Qty issued, Item code, name, Date of issue, Balance
└──────────────┘        of item
```
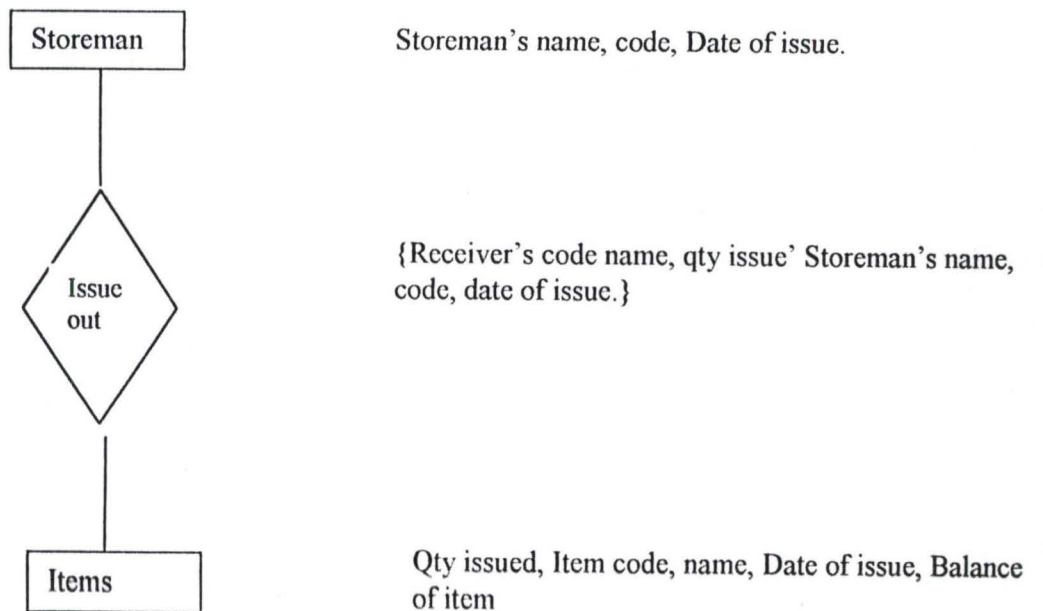
Fig 3.1 c E-R diagram for Issuing of Items From the stores

d)　　　　　　**Accountant**

Accountant	{Acct name, code, PV no, job tittle}

Orders Payment To	{Acct name, code, contractor name, code, job tittle, Amount paid, Balance, PV no, Date of payment.}

Contractor	{Contractor's name, code, Initial sum.}
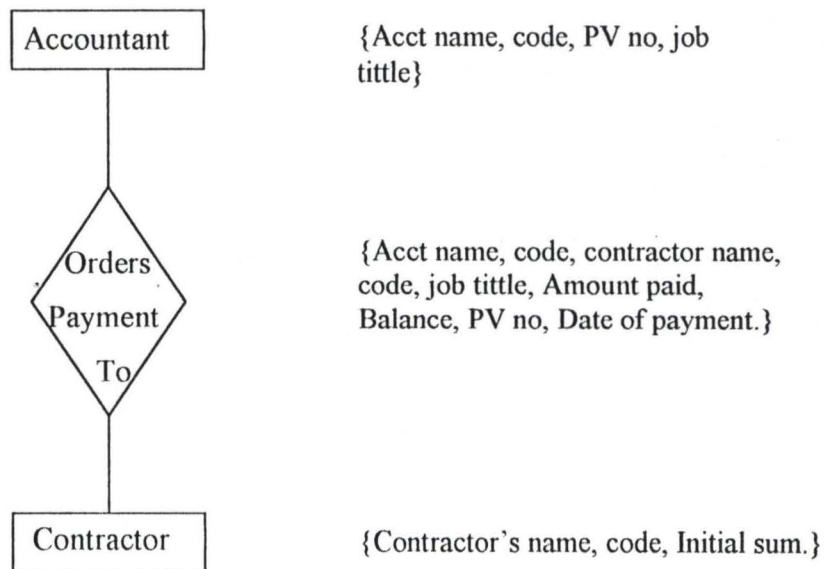
Fig 3.1d E-R Diagram for making a payment to a contractor

e) **Engineer**

Engineer   {Engineer's name, code, job title, date of request}

Request
For   {Engineer's name, code, item name, code, job tittle.}

Item   {Item name, code, qty request, balance of item}

Fig 3.1e E-R diagrams for a request from the store.

COMBINING THE ENTITIES OF ESTIMATOR, CONTRACTOR AND ITEM
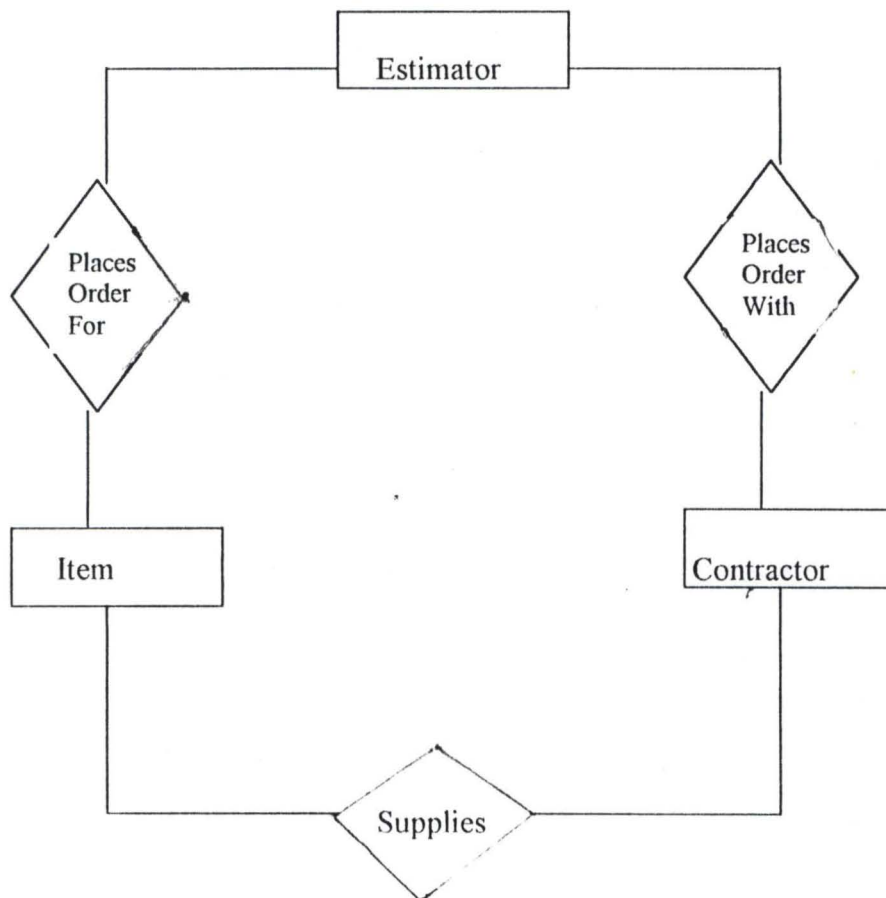
3.06   SPECIFICATION OF LOGICAL DESIGN ELEMENTS

In a relational database approach one thing lead to another, first the conceptual data model, then the Entity-relation analysis. A well constituted E-R analysis is referred to as a logical database model. Software based on the various relations can now be developed. The knowledge required to develop the software are that of the structure English, Data Dictionary and Entity-relation analysis.

The logical database model can further be translated into physical database by mapping them into a storage device, once they are stored they become the physical database. The software developed can now be used to perform functions like deleting, sorting update etc.

The design elements will need to be specified here, the most important of them will be considered i.e. Input design , output design ,file design and procedure.

3.07   DATA INPUT DESIGN

One of the elements of design is input, before the input design is discussed it is necessary to state that there are two main methods of data input namely on-line and offline. On-line emphasize that the user should key in his dat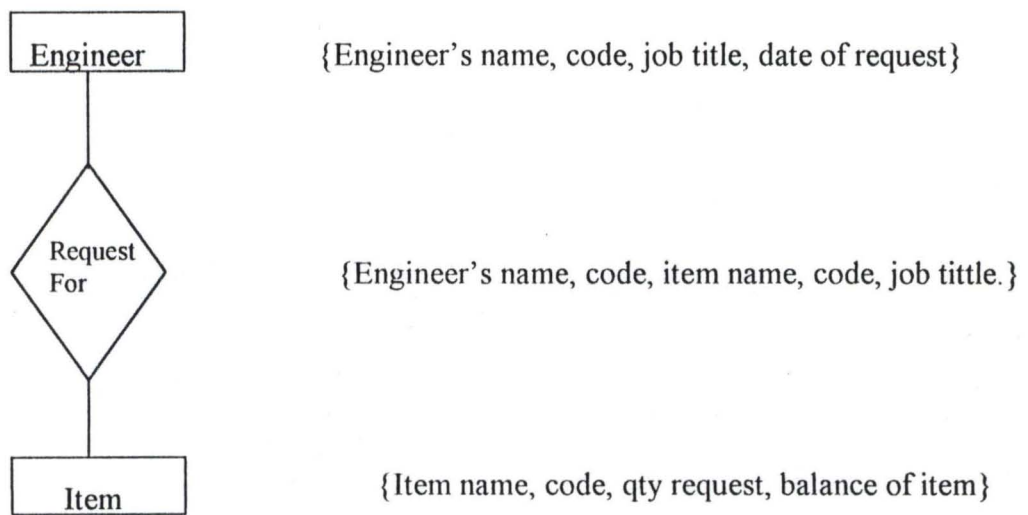a directly from the keyboard. One form of Offline is obtained by entering the data on a form before transferring the collection of data on the form into the computer at a later period. The following are the methods open to the user for a choice;

a) On-line transmission of data from source i.e. Direct data entry

b) Key to diskette; source document keyed directly into diskette.

c) The source document itself prepared in machine sensible medium using character recognition.

d) Data capture devices.

e) Source data captured from 'Tag' plastic badges or strips.

f) Portable encoding devices.

For the purpose of this project work the on-line direct data entry is found most suitable for the data entry routine. This simply consists of a keyboard, processor and a VDU. The operator keys data in through the keyboard.

3.07 OUTPUT DESIGN

In the output design, we shall try to present the format by which the output report will be presented, a study will also be made on the type of device suitable for the specified format.

Output devices

The commonest output devices are the printers and the Monitor, printers are particularly appropriate when report are meant for many person's consumption. There are two broad classes of printers namely, Impact and non- impact. A choice of non-impact printer is suggested for this work i.e. a Laser Jet printer with a speed of 6 pages per minute. This choice is based on volume of report expected, which is moderate.

Output format

a) On the screen; the program is written in such a way that the screen is menu driven, option are given and a user has the opportunity of clicking whatever option he desires. For example a section of the menu reads:

> Click to open
> ITC Network 33kv transmission
> ITN Network 11kv
> TDN Network
> Exit

The interactive data input technique is employed to do this job.

Some other time the control is achieved by the pressing of a button.

> Take example of section of the program that gives the following options;

>> Estimating
>> Supplies of item
>> Store issuing
>> Payments

Control is achieve by the instructions:

> Press E for estimation
>
> Press S for supply
>
> Press I for issuing
>
> Press P for payment.

Provisions are already embedded in the programme to accommodate these events. However consideration should be given for the fact that VDU screen contains 80 columns and 24 rows, this is important to note so that the screen will contain the pages of output as expected.

3.08   FILE DESIGN

In file design, it is the desire of the system designer to specify the type of filing procedure required for the system, to recommend the storage device and to give a general over-view of how data and information will be stored in the storage of the computer to ensure a hitch free transaction.

Types of files: The types of files to be created on the system are three namely; Master file, Program file and Transaction file.

The Program file houses the programs written to develop the software and access to this file is restricted, a password is required to allow for modification.

Master file will contain information of the permanent nature, and since updating of this file will not be frequent it is suitable for storage of information of such jobs [constructions] that has been completed and commissioned.

The transaction file will serve the purpose of keeping documents for present transactions. The transaction file will be used to update (at a weekly interval,) the master file.

File media

For the purpose of storing our information and data we recommend the use of Disks, three types of Disk will be used namely: 3.5 floppy disk, 5.25 floppy disk and the hard disks are direct access method and are the suitable media for this software.

File Access

A direct access filing system is proposed for this system. The choice of Disks [as against tapes] afforded us the opportunity of this direct accessing. A direct access device is also suitable for random accessing. The Disk is a direct access medium having high data transfer speeds with great storage capacity and is therefore suitable for the purpose of this project. In order to make the direct access media faster the key field of the records are coded in numerical values. Also to facilitate the random accessing two tools known as 'seek' and 'Find' were made use of while writing the software.

3.09   PROCEDURE

By procedure it is the intention of the system designer to give a complete narration of steps taken in writing the software. The programs are written in modules, for each module a flowchart is presented. The language of programming is the Dbase4 and the CLIPPER is used for Compilation.

3.10   CONTROL

In the information system control refers to the techniques put in place in order to achieve a reliable output from the system. This control is included in the design to ensure that the data entering the computer are correct. Control also guard against fraud and it provides a means of auditing the steps in a procedure.

There are quite a number of methods used to achieve control, some of which are:

Organizational measure

Input preparation control

Processing control

In this project work the combination of the three methods are applied in this manner:

<u>Organization measure</u>: it is recommended to users that the job of data entry be placed in the hands of one person who is thoroughly briefed of the implication of Un-authorized data changes. All changes must be monitored by the supervisor.

<u>Input preparation controls</u>: Another way of achieving controls is the use of serial coding for the key field of each record. What this implies is that each item on the list is assigned a peculiar code and it is this code that computer use in recognizing the item –this is reflected in the programme.

<u>Processing control</u>: Under the processing control a number of short subroutine are built into the programme to disallow incorrect data to be entered into the system, one of such subroutine is given below

Example: If a sum of money was budgeted for a particular work, and such work involves procurement of a number of items, it will then be wrong for a single item to gulp all the money meant for several items, we must guard against traditional value in data entry, such a sub will read:

```
H = 20 000
Input "Enter the rate" Rate
IF Rate > H
? Error
Else
Amount = Qty + Rate
End IF
```

[A sub program to prevent entering a rate above =N= 20 000]

3.11   SYSTEM AUDITING

In an organization an auditor either internal or external is employed to guard against fraudulent practices, so it is with the computer system .As the system is being developed an auditor is carried along who chips in one or two advice, as the system is completed the auditor can now carry out a check , the following checks are possible

(a) Check around the computer

(b) Check through the computer

Each of these checks has it own methodology. If an information system is large in content surely a stand-alone auditor should be employed, but for a small system like the one we are designing a system designer can combine the role.

Auditing is carried out in this project work using the 'auditing around the computer'. We illustrate this by an example. In the stock control segment of the programme, we audited by reconciling output with the input. We make a sport check to verify if the initial quantity of items in stock and the present balance of the stock is rational in a case when some quantity of items were issued out. This is a typical case of auditing around the computer. To audit 'with the computer' in a large database system an auditing package made for system auditing should be employed to run the system and make the appropriate checks, this is not our concern here.

3.11   SYSTEM SECURITY

It is required that all the programme developed for this system and all the data that will be maintained on the system should be protected against accidental fire, theft, damage and plagiarism. This objective is realized in this project using the following method:

(a) A password is coded into the system; unless the password is spelt out no access will be granted to a user.

(b) A back-up of the written software is made in Triplicate one copy will be release for use, 'The father' copy in the shelve, while the 'Grand father' copy will be retained by the designer –so that if an accidental loss of program occur the system can be restored.

3.12   FLOW-CHART AND PROGRAMS

What follows now is the various flow-chart for different modules of the program, These include Data entry, Sorting,, deleting etc. etc.

PROGRAM FLOWCHART FOR DATA ENTRY
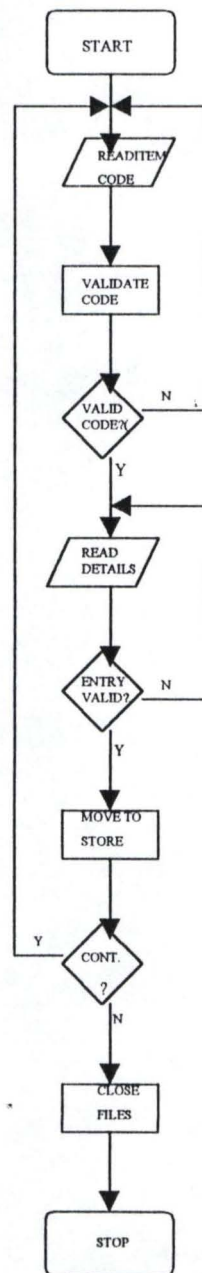
FIG 3.2

PROGRAM FLOWCHART FOR REPORT
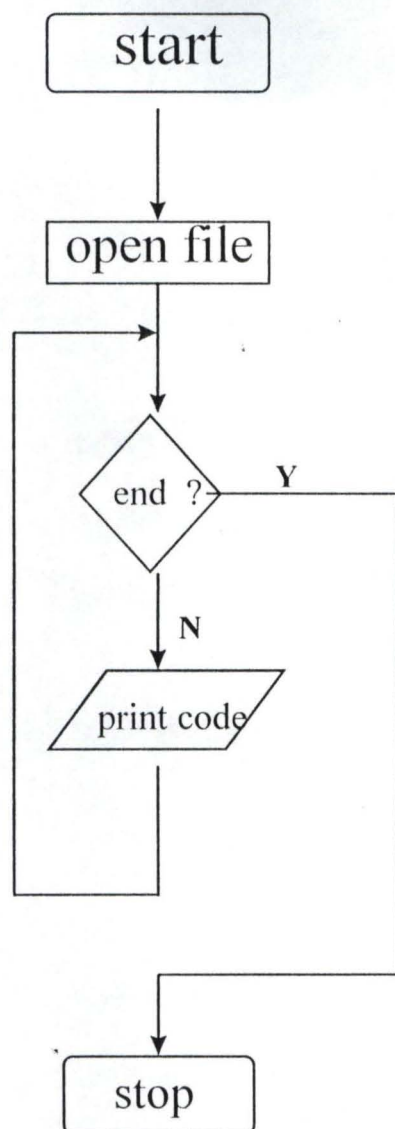
fig 3.3

PROGRAM FLOWCHART FOR DATA MODIFICATION
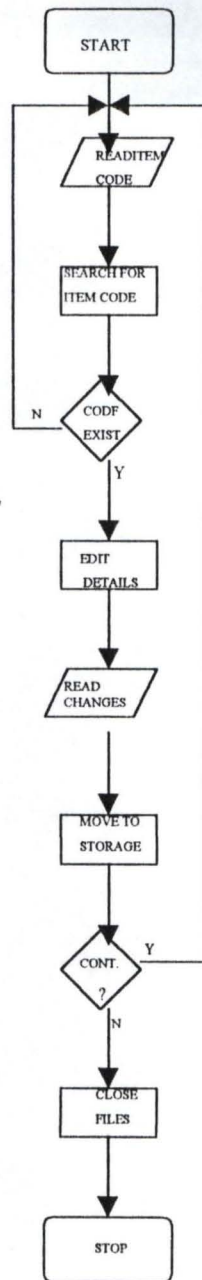
FIG 3.4

PROGRAM FLOWCHART FOR DELETION[44]

START

READ
ITEM CODE

SEARCH FOR
ITEM CODE

DOES
ITEM CODE
EXIST ?   N

DISPLAY
DETAILS

EFFECT
DELETION?   N

Y

REMOVE DATA
FROM STORAGE

Y   DELETE
ANOTHER
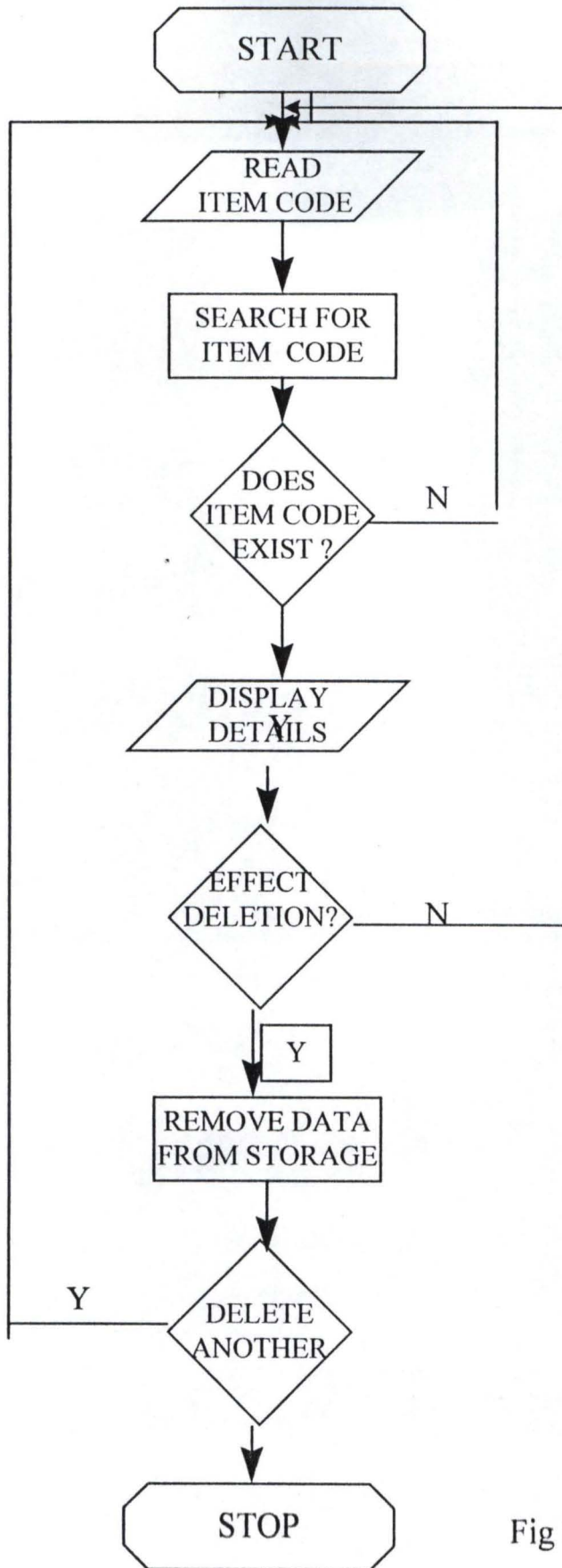
STOP   Fig 3.5

THE OUTLAY OF THE MAINMENU AND SUB MENU
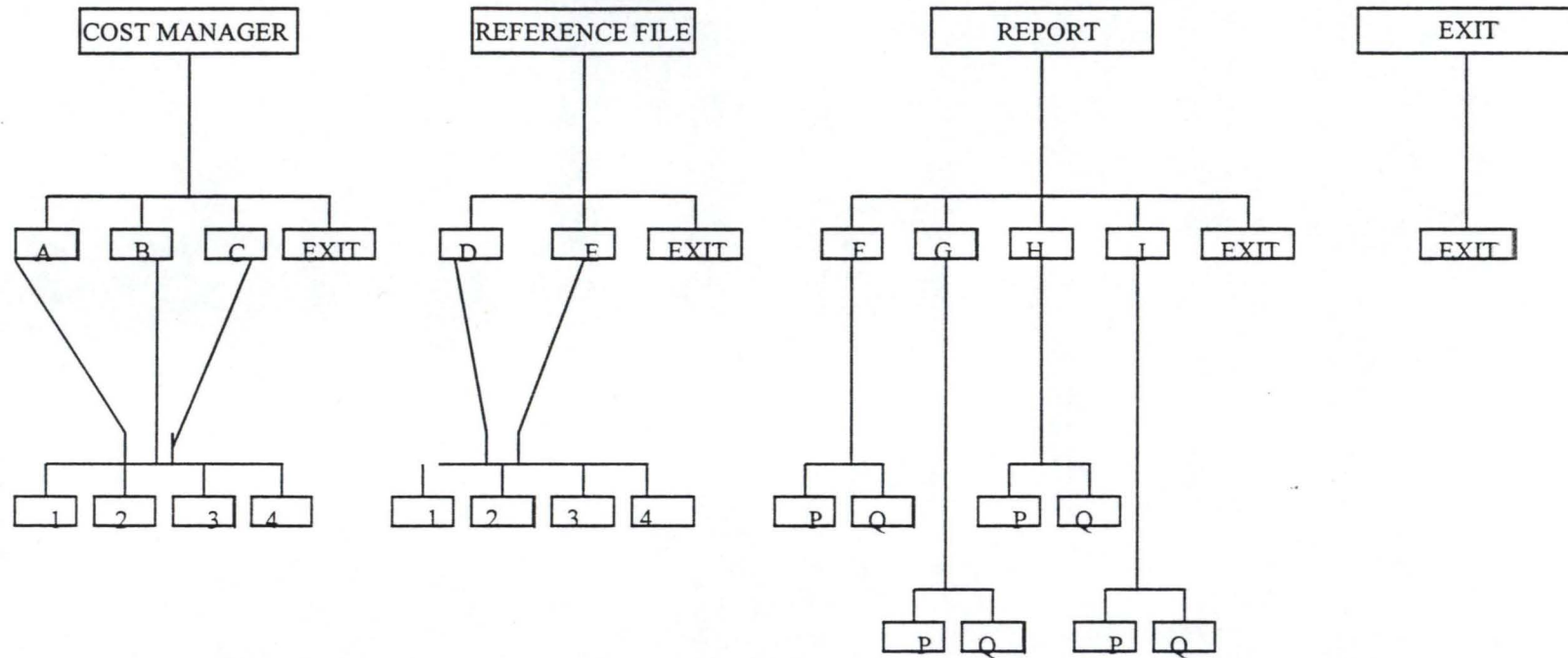
A=33KV LINE	F=REPORT ON STOCK CODDING	
B=11KV LINE	G=REPORT ON 33KVLINE	1 = CREAT
C=TDN,TRANS	H=REPORT ON 11KV LINE	2 = MODIFY
D=STOCK CODDING.	I=REPORT ON TDN WORK	3 = VIEW
E=USER'S PASSWORD	P=PRINT	4 = DELETE
	Q=QUIT THE SCENE	

FIG 3. 6

```
*--------------------------------------------------------------------------------------------46-
*AUTHOR        :  ENGR. YUSUF LABBOH
*LICENSEE      :  NIGER STATE RURAL ELECTRIFICATION BOARD - REB
*PROJECT TITLE :  COSTING OF TDN & 11KV, 33KV (ITC) TRANSMISSION LINE
*--------------------------------------------------------------------------------------------
Set Talk off
Set Echo off
Set Bell off
Set Stat off
Set Scor off
Set Safe off
Set Conf off
Set Esca off
Set Wrap on
set proc to clap
Set date to brit
private sc_hpop  // Saves horizontal popup
clear
*do floor
*do warn
x = inkey (2)
Set color to w+/br, ,
do lftcarpet
@ 00,00 clear to 05,79
@ 00,00 to 05,79 color "w+/r"
depot1="COSTING OF TDN & 11KV, 33KV (ITC) TRANSMISSION LINE"
depot2="(A Case Study of Niger State Rural Electrification Board, Minna.)"
@ 01,(80-len(depot1))/2 say depot1
@ 02,(80-len(depot2))/2 say depot2
Do while .t.
@21,08 clea to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 04,01 prompt "COST MANAGER"
@ 04,20 prompt "REFERENCE FILE"
@ 04,40 prompt "REPORT"
@ 04,55 prompt "UTILITY"
@ 04,70 prompt "Exit"
menu to ch1
Save screen to sc_hpop
Do case
  case ch1 = 1
    do PM
  case ch1 = 2
    do RF
  case ch1 = 3
    do REPorter
  case ch1 = 4
```

```
        do UTY
    othe
        exit
Endcase
Restore Screen from sc_hpop
Enddo
clear
@23,01 say "COST MANAGER, Undergoes Normal Shut Down...!!!"
?
Return
*/------------------------Menu Choice for manager-----------------------
Procedure PM
private sc_vpop
Do while .t.
Set color to w+/b
@ 06,00 clear to 14,24
@ 06,00 to 14,24

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 07,1 prompt " 33KV Transmission Line"
@ 09,1 prompt " 11KV Transmission Line"
@ 11,1 prompt " Township Distribution."
@ 13,1 prompt " Exit Main Menu........"
menu to fchoice
Save screen to sc_vpop
Do case
  CASE fchoice = 0
     loop
  case fchoice = 1
     do ttline
  case fchoice = 2
     do otline
  case fchoice = 3
     do td
  othe
     exit
Endcase
clea
Restore Screen from sc_vpop
Enddo
Return
*/------------------------Menu Choice for Reservation-----------------------
Procedure ttline
Do while .t.
Set color to w+/b
@ 08,25 clear to 18,44
```

```
@ 08,25 to 18,44

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 09,26 prompt " Creat New File.."
@ 11,26 prompt " Modify File....."
@ 13,26 prompt " View File......."
@ 15,26 prompt " Delete File....."
@ 17,26 prompt " Exit Menu......."

menu to ch2
Save screen
Do case
  case ch2 = 0
     loop
  case ch2 = 1
     do cttline
  case ch2 = 2
     do mttline
  case ch2 = 3
     do vttline
  case ch2 = 4
     do dttline
    other
     exit
Endcase
Rest Screen
Enddo
Return


*/-----------------------Menu Choice for Billing-----------------------
Procedure otline
Do while .t.
Set color to w+/b
@ 08,25 clear to 18,44
@ 08,25 to 18,44

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 09,26 prompt " Creat New File.."
@ 11,26 prompt " Modify File....."
@ 13,26 prompt " View File......."
@ 15,26 prompt " Delete File....."
@ 17,26 prompt " Exit Menu......."
```

```
menu to bchoice
Save screen
Do case
   case bchoice = 1
      do cotline
   case bchoice = 2
      do motline
   case bchoice = 3
      do votline
   case bchoice = 4
      do dotline
   case bchoice = 0
      loop
   other
      exit
Endcase
clea
Restore Screen
Enddo
Return
*/----------------------Menu Choice for Billing----------------------
Procedure td
Do while .t.
Set color to w+/b
@ 08,25 clear to 18,44
@ 08,25 to 18,44

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 09,26 prompt " Creat New File.."
@ 11,26 prompt " Modify File....."
@ 13,26 prompt " View File......."
@ 15,26 prompt " Delete File....."
@ 17,26 prompt " Exit Menu......."

menu to bchoice
Save screen
Do case
   case bchoice = 1
      do ctd
   case bchoice = 2
      do mtd
   case bchoice = 3
      do vtd
   case bchoice = 4
      do dtd
   case bchoice = 0
```

```
      loop
    other
        exit
Endcase
clea
Restore Screen
Enddo
Return


*/-----------------------Menu Choice for manager-----------------------
Procedure RF
private sc_vpop
Do while .t.
Set color to w+/b
@ 06,20 clear to 12,44
@ 06,20 to 12,44

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 07,21 prompt " Stock Items Coding...»"
@ 09,21 prompt " Users Password.......»"
@ 11,21 prompt " Exit Main Menu........"

menu to fchoice
Save screen to sc_vpop
Do case
  CASE fchoice = 0
     loop
  case fchoice = 1
     do tc
  case fchoice = 2
     do ups
  othe
     exit
Endcase
clea
Restore Screen from sc_vpop
Enddo
Return


*/-----------------------Menu Choice for Table Files-----------------------
Procedure tc && Tank Coding
Do while .t.
Set color to w+/b

@ 08,45 clear to 18,63
@ 08,45 to 18,63
```

```
@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 09,46 prompt " Creat New File.."
@ 11,46 prompt " Modify File....."
@ 13,46 prompt " View File......."
@ 15,46 prompt " Delete File....."
@ 17,46 prompt " Exit Menu......."

menu to tchoice
Save screen
Do case
  case tchoice = 1
     do ctc
  case tchoice = 2
     do mtc
  case tchoice = 3
     do vtc
  case tchoice = 4
     do dtc
  case tchoice = 0
     loop
  other
     exit
Endcase
Restore Screen
Enddo
Return


*/-----------------------Menu Choice for Table Files-----------------------
Procedure ups && Users Password
Do while .t.
Set color to w+/b

@ 08,45 clear to 18,63
@ 08,45 to 18,63

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 09,46 prompt " Creat New File.."
@ 11,46 prompt " Modify File....."
@ 13,46 prompt " View File......."
@ 15,46 prompt " Delete File....."
@ 17,46 prompt " Exit Menu......."

menu to tchoice
```

```
Save screen
Do case
  case tchoice = 1
     do cups
  case tchoice = 2
     do mups
  case tchoice = 3
     do vups
  case tchoice = 4
     do dups
  case tchoice = 0
     loop
  other
     exit
Endcase
Restore Screen
Enddo
Return
*/-----------------------Menu Choice for manager-----------------------
Procedure reporter
private sc_vpop
Do while .t.
Set color to w+/b
@ 06,36 clear to 16,78
@ 06,36 to 16,78

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 07,37 prompt " Report on Stock Items Coding............."
@ 09,37 prompt " Report on All Costing of 33KV (ITC)....."
@ 11,37 prompt " Report on All Costing of 11KV (ITC)....."
@ 13,37 prompt " Report on Town Distribution Network....."
@ 15,37 prompt " Exit Main Menu........................."

menu to fchoice
Save screen to sc_vpop
Do case
  CASE fchoice = 0
     loop
  case fchoice = 1
     do rep1
  case fchoice = 2
     do rep2
  case fchoice = 3
     do rep3
  case fchoice = 4
     do rep4
```

```
     othe
        exit
Endcase
clea
Restore Screen from sc_vpop
Enddo
Return
*/------------------------Menu Choice for manager-------------------------
Procedure UTY
private sc_vpop
Do while .t.
Set color to w+/b
@ 06,55 clear to 14,77
@ 06,55 to 14,77

@21,08 clear to 23,71
@21,08 to 23,71
@22,10 say 'Use '+chr(25)+' or '+chr(24)+' key to highlight option & press
'+chr(17)+chr(196)+chr(217) +' key to select'
@ 07,56 prompt " Introduction.......»"
@ 09,56 prompt " Backup Files.......»"
@ 11,56 prompt " Restore Files......»"
@ 13,56 prompt " Exit Main Menu......"

menu to fchoice
Save screen to sc_vpop
Do case
   CASE fchoice = 0
      loop
   case fchoice = 1
      !attrib +r intro.txt
      !edit intro.txt
   case fchoice = 2
      do bf
   case fchoice = 3
      do RFile
   othe
      exit
Endcase
clea
Restore Screen from sc_vpop
Enddo
Return

clear
set color to w+/b
set proc to header
do head
h3="Costing of A 33KV (ITC) Transmission Line into Databases"
```

```
@05,(80-len(h3))/2 say h3
@05,69 say "PART No :"
*------------------------ Initializing Varaibles ----------------------------
  use items
  index on itemcode to itemcode

  @ 07,03 say "REG. DATE"
  @ 07,16 say "ITEM CODE"
  @ 07,30 say "ITEMS DESC"
  @ 07,50 say "UNIT"
  @ 07,55 say "QTY"
  @ 07,60 say "RATE"
  @ 07,69 say "AMOUNT"


  I = 1
 Do while .t.
   set proc to var_h
   do xpublic
   do tvar
    @22,02 clea to 23,77
    do while .t.
      xpart=space(01)
      @ 22,20 say "ENTER THE PART CODE (A TO F) " get xpart pict "!"
      read
      if xpart=space(01)
        @23,02 clea to 23,77
        fb="PART CODE CANNOT BE EMPTY, Press Any Key To Retry"
        @23,(80-len(fb))/2 say fb
        set cons off
        wait " "
        @23,02 clea to 23,77
        loop
      endif
      if xpart $ "ABCDEF"
        exit
      endif
    enddo
    *------------------------ Initialization of Variables-------------------
    @05,78 get xpart pict "!" color "gr*+/b"
    clea gets
    @22,02 clea to 23,77
if I < 10
    @ 08+I,03 get xregdate pict "99/99/99"
    clear gets
   do while .t.
     fb="Enter Item Code or Press Enter Key on Item Code To Exit"
     @23,02 clea to 23,77
     @23,(80-len(fb))/2 say fb
     @ 08+I,19 get xitemcode pict "999"
```

```
      do boye
        x=0
        do while x=0
         x=inkey()
         if upper (chr(x)) $ "SRA"
           exit
         endif
          x=0
        enddo
        if upper (chr(x)) $ "R"
          @08+i,03 clea to 19,77
          @22,02 clea to 23,77
          fb="Enter Stock Item Code or Press Enter Key on Item Code to Exit"
          @23,02 clea to 23,77
          @23,(80-len(fb))/2 say fb
          loop
        endif
        if upper (chr(x)) $ "A"
          clear
          close all
          return
        endif
      use cost1
      index on itemcode to itemcode
      appen blank
      repl regdate with date()
      repl regtime with xregtime
      repl itemcode with xitemcode
      repl desc with xdesc
      repl unit with xunit
      repl qty with xqty
      repl rate with xrate
      repl part with xpart
      i =i+2
        @22,02 clea to 23,77
        use
        use items
        index on itemcode to itemcode
        loop
         Else
        l=1
Endif
Enddo
retu
*-------------------------------- EOF----------------------------------------
```

```
clear
set color to w+/b
set proc to header
```

```
do head
h3="Costing of A 11KV (ITC) Transmission Line into Databases"
@05,(80-len(h3))/2 say h3
@05,69 say "PART No :"
*----------------------- Initializing Varaibles ----------------------------
  use items
  index on itemcode to itemcode

  @ 07,03 say "REG. DATE"
  @ 07,16 say "ITEM CODE"
  @ 07,30 say "ITEMS DESC"
  @ 07,50 say "UNIT"
  @ 07,55 say "QTY"
  @ 07,60 say "RATE"
  @ 07,69 say "AMOUNT"

  I = 1
Do while .t.
  set proc to var_h
  do xpublic
  do tvar
   @22,02 clea to 23,77
   do while .t.
    xpart=space(01)
    @ 22,20 say "ENTER THE PART CODE (A TO F) " get xpart pict "!"
    read
    if xpart=space(01)
      @23,02 clea to 23,77
      fb="PART CODE CANNOT BE EMPTY, Press Any Key To Retry"
      @23,(80-len(fb))/2 say fb
      set cons off
      wait " "
      @23,02 clea to 23,77
      loop
    endif
    if xpart $ "ABCDEF"
      exit
    endif
   enddo
   *----------------------- Initialization of Variables-------------------
  @05,78 get xpart pict "!" color "gr*+/b"
  clea gets
  @22,02 clea to 23,77
if I < 10
    @ 08+I,03 get xregdate pict "99/99/99"
    clear gets
   do while .t.
    fb="Enter Item Code or Press Enter Key on Item Code To Exit"
    @23,02 clea to 23,77
```

```
@23,(80-len(fb))/2 say fb
@ 08+I,19 get xitemcode pict "999"
read
if xitemcode=space(03)
  clear
  close all
  return
endif
go top
seek xitemcode
if .not. found()
  fb="ITEM CODE DOES NOT EXIST, Press Any Key To Retry"
  @23,02 clea to 23,77
  @23,(80-len(fb))/2 say fb
  set cons off
  wait " "
  @23,02 clea to 23,77
  xitemcode=space(03)
  loop
endif
xdesc=desc
xunit=unit
xrate=rate
exit
enddo
  @ 08+I,24 get xdesc pict "@!"
  @ 08+I,51 get xunit pict "@!"
  clea gets
do while .t.
  fb="STOCK ITEM QUANTITY CANNOT BE EMPTY, Press Any Key To Retry"
  @ 08+I,55 get xqty pict "999"
  read
  if xqty=0
    @23,02 clea to 23,77
    @23,(80-len(fb))/2 say fb
    set cons off
    wait " "
    @23,02 clea to 23,77
    loop
  endif
  exit
enddo
  @ 08+I,59 get xrate pict "99,999.99"
  clea gets

  xamount=(xrate*xqty)
  @ 08+I,69 get xamount pict "99,999.99"
  clea gets
*-------------------------------------------------------------------
```

```
    @22,02 clea to 23,77
    set proc to saver
    do boye
      x=0
      do while x=0
       x=inkey()
       if upper (chr(x)) $ "SRA"
         exit
       endif
        x=0
      enddo
      if upper (chr(x)) $ "R"
         @08+i,03 clea to 19,77
         @22,02 clea to 23,77
         fb="Enter Stock Item Code or Press Enter Key on Item Code to Exit"
         @23,02 clea to 23,77
         @23,(80-len(fb))/2 say fb
         loop
      endif
      if upper (chr(x)) $ "A"
         clear
         close all
         return
      endif
      use cost1
      index on itemcode to itemcode
      appen blank
      repl regdate with date()
      repl regtime with xregtime
      repl itemcode with xitemcode
      repl desc with xdesc
      repl unit with xunit
      repl qty with xqty
      repl rate with xrate
      repl part with xpart
      i =i+2
         @22,02 clea to 23,77
         use
         use items
         index on itemcode to itemcode
         loop
         Else
      I=1
Endif
Enddo
retu
*-------------------------------- EOF---------------------------------------

clear
```

```
set color to w+/b
set proc to header
do head
h3="Costing of A Township Distribution Network"
@05,(80-len(h3))/2 say h3
@05,69 say "PART No :"
*----------------------- Initializing Varaibles ----------------------------
  use items
  index on itemcode to itemcode

  @ 07,03 say "REG. DATE"
  @ 07,16 say "ITEM CODE"
  @ 07,30 say "ITEMS DESC"
  @ 07,50 say "UNIT"
  @ 07,55 say "QTY"
  @ 07,60 say "RATE"
  @ 07,69 say "AMOUNT"

  I = 1
 Do while .t.
   set proc to var_h
   do xpublic
   do tvar
   @22,02 clea to 23,77
   do while .t.
     xpart=space(01)
     @ 22,20 say "ENTER THE PART CODE (A TO F) " get xpart pict "!"
     read
     if xpart=space(01)
       @23,02 clea to 23,77
       fb="PART CODE CANNOT BE EMPTY, Press Any Key To Retry"
       @23,(80-len(fb))/2 say fb
       set cons off
       wait " "
       @23,02 clea to 23,77
       loop
     endif
     if xpart $ "ABCDEF"
       exit
     endif
   enddo
   *----------------------- Initialization of Variables------------------
   @05,78 get xpart pict "!" color "gr*+/b"
   clea gets
   @22,02 clea to 23,77
if I < 10
     @ 08+I,03 get xregdate pict "99/99/99"
     clear gets
   do while .t.
```

```
fb="Enter Item Code or Press Enter Key on Item Code To Exit"
@23,02 clea to 23,77
@23,(80-len(fb))/2 say fb
@ 08+I,19 get xitemcode pict "999"
read
if xitemcode=space(03)
  clear
  close all
  return
endif
go top
seek xitemcode
if .not. found()
  fb="ITEM CODE DOES NOT EXIST, Press Any Key To Retry"
  @23,02 clea to 23,77
  @23,(80-len(fb))/2 say fb
  set cons off
  wait " "
  @23,02 clea to 23,77
  xitemcode=space(03)
  loop
endif
xdesc=desc
xunit=unit
xrate=rate
exit
enddo
@ 08+I,24 get xdesc pict "@!"
@ 08+I,51 get xunit pict "@!"
clea gets
do while .t.
  fb="STOCK ITEM QUANTITY CANNOT BE EMPTY, Press Any Key To Retry"
  @ 08+I,55 get xqty pict "999"
  read
  if xqty=0
    @23,02 clea to 23,77
    @23,(80-len(fb))/2 say fb
    set cons off
    wait " "
    @23,02 clea to 23,77
    loop
  endif
  exit
enddo
@ 08+I,59 get xrate pict "99,999.99"
clea gets

xamount=(xrate*xqty)
@ 08+I,69 get xamount pict "99,999.99"
```

```
  clea gets
  *------------------------------------------------------------------
@22,02 clea to 23,77
set proc to saver
do boye
  x=0
  do while x=0
   x=inkey()
   if upper (chr(x)) $ "SRA"
     exit
   endif
    x=0
  enddo
   if upper (chr(x)) $ "R"
     @08+i,03 clea to 19,77
     @22,02 clea to 23,77
     fb="Enter Stock Item Code or Press Enter Key on Item Code to Exit"
     @23,02 clea to 23,77
     @23,(80-len(fb))/2 say fb
     loop
   endif
   if upper (chr(x)) $ "A"
     clear
     close all
     return
   endif
  use cost1
  index on itemcode to itemcode
  appen blank
  repl regdate with date()
  repl regtime with xregtime
  repl itemcode with xitemcode
  repl desc with xdesc
  repl unit with xunit
  repl qty with xqty
  repl rate with xrate
  repl part with xpart
  i =i+2
    @22,02 clea to 23,77
    use
    use items
    index on itemcode to itemcode
    loop
    Else
   I=1
Endif
Enddo
retu
*---------------------------------- EOF----------------------------------------
```

```
    clea
    use items
    index on itemcode to itemcode
    outer="[P]rinting            [C]ancel"
    @13,(80-len(outer))/2 say outer
    x=0
    do while x=0
      x=inkey()
     if upper (chr(x)) $ "PC"
       exit
     endif
      x=0
    enddo
 if upper (chr(x)) $ "C"
    clear
    close all
    return
  endif
    clea
    warn="DO NOT DISTURB PRINTING IN PROGRESS"
    @13,(80-len(warn))/2 say warn color "w+*/r"

    set device to print
    fouter="NIGER STATE RURAL ELECTRICITY BOARD, MINNA."
    souter="REPORT ON ALL STOCK ITEMS CODING"
    @01,(80-LEN(fouter))/2 say fouter
    @02,(80-LEN(souter))/2 say souter
    @04,01 say "S/NO"
    @04,06 say "ITEM CODE"
    @04,16 say "DESCRIPTION"
    @04,44 say "UNIT"
    @04,50 say "QTY"
    @04,60 say "RATE"
    @04,70 say "AMOUNT"
    @05,01 say repl ("=",77)
    xpage=1
    row=06
    mrow=62
    xsno=1
    go top
    kounter=35
    adder=0
    do while .not. eof()
     if row>mrow
       eject
       clear
       xpage=xpage+1
       row=06
```

```
        fouter="NIGER STATE RURAL ELECTRICITY BOARD, MINNA."
        souter="REPORT ON ALL STOCK ITEMS CODING"
        @01,(80-LEN(fouter))/2 say fouter
        @02,(80-LEN(souter))/2 say souter
        @04,01 say "S/NO"
        @04,06 say "ITEM CODE"
        @04,16 say "DESCRIPTION"
        @04,44 say "UNIT"
        @04,50 say "QTY"
        @04,60 say "RATE"
        @04,70 say "AMOUNT"
        @05,01 say repl ("=",77)
    endif
    xitemcode=itemcode
    xdesc=desc
    xunit=unit
    xqty=qty
    xrate=rate
    xamount=xrate*xqty
    @row,01 say xsno       pict "9999"
    @row,09 say xitemcode pict "999"
    @row,16 say xdesc     pict "@!"
    @row,44 say xunit     pict "@!"
    @row,50 say xqty      pict "999"
    @row,55 say xrate     pict "99,999.99"
    @row,66 say xamount   pict "999,999.99"
    clea
    row=row+1
    xsno=xsno+1
    skip
 enddo
 eject
 use
 set device to screen
jobend="REB HAS COMPLETED PRINTING JOB, Press Any Key To Continue..."
clear
@23,(80-len(jobend))/2 say jobend
set cons off
wait " "
set cons on
clea
return
*----------------------- Initializing Varaibles ----------------------------
    selec 1
    use temp
    index on part to party
    go top
    xparty=part
```

```
    sele 2
    use cost1
    index on part to part
    go top
    xpart=part

  clear
  outer="[P]rinting            [C]ancel"
  @13,(80-len(outer))/2 say outer
  x=0
  do while x=0
      x=inkey()
     if upper (chr(x)) $ "PC"
       exit
     endif
      x=0
  enddo
if upper (chr(x)) $ "C"
     clear
     close all
     return
  endif
     clea
     warn="DO NOT DISTURB PRINTING IN PROGRESS"
     @13,(80-len(warn))/2 say warn color "w+*/r"

     set device to print
     fouter="NIGER STATE RURAL ELECTRICITY BOARD, MINNA."
     souter="REPORT ON ALL 33KV (ITC) TRANSMISSION LINE"
     @01,(80-LEN(fouter))/2 say fouter
     @02,(80-LEN(souter))/2 say souter
     @04,01 say "S/NO"
     @04,06 say "ITEM CODE"
     @04,16 say "DESCRIPTION"
     @04,44 say "UNIT"
     @04,50 say "QTY"
     @04,60 say "PART"
     @04,70 say "AMOUNT"
     @05,01 say repl ("=",77)
     xpage=1
     row=06
     mrow=62
     xsno=1
     go top
     kounter=35
     adder=0
     xamt=0.00
     xamt1=0.00
     set filter to xparty=xpart
```

```
do while .not. eof()
  if row>mrow
    eject
    clear
    xpage=xpage+1
    row=06
     fouter="NIGER STATE RURAL ELECTRICITY BOARD, MINNA."
     souter="REPORT ON ALL 33KV (ITC) TRANSMISSION LINE"
     @01,(80-LEN(fouter))/2 say fouter
     @02,(80-LEN(souter))/2 say souter
     @04,01 say "S/NO"
     @04,06 say "ITEM CODE"
     @04,16 say "DESCRIPTION"
     @04,44 say "UNIT"
     @04,50 say "QTY"
     @04,60 say "PART"
     @04,70 say "AMOUNT"
     @05,01 say repl ("=",77).
  endif

  xitemcode=itemcode
  xdesc=desc
  xunit=unit
  xqty=qty
  xrate=rate
  xpart=part
  xamount=xrate*xqty
  @row,01 say xsno      pict "9999"
  @row,09 say xitemcode pict "999"
  @row,16 say xdesc     pict "@!"
  @row,44 say xunit     pict "@!"
  @row,50 say xqty      pict "999"
  @row,61 say xpart     pict "!"
  @row,66 say xamount   pict "9,999,999.99"
  clea
  xamt=xamt+xamount
  skip

  xpart=part
  xsno=xsno+1
  row=row+2

  if eof ()
    xsno=1
    *xamt=xamt+xamount
    row=row+1
    @row,01 say repl ("=",77)
    row=row+1
    @row,05 say "SUB TOTAL OF PART  "+ " " +xparty
```

```
        @row,60 say xamt pict "9,999,999,999.99"
          row=row+1
          @row,01 say repl ("=",77)

          sele 1
          skip
          xparty=part

          sele 2
          set filter to xparty=xpart
        endif
      enddo
      eject
      use
      set device to screen
jobend="REB HAS COMPLETED PRINTING JOB, Press Any Key To Continue..."
clear
@23,(80-len(jobend))/2 say jobend
set cons off
wait " "
set cons on
clea
return
*----------------------- Initializing Varaibles ---------------------------
      selec 1
      use temp
      index on part to party
      go top
      xparty=part

      sele 2
    use cost2
      index on part to part
      go top
      xpart=part
          clear
    outer="[P]rinting              [C]ancel"
    @13,(80-len(outer))/2 say outer
    x=0
    do while x=0
       x=inkey()
      if upper (chr(x)) $ "PC"
        exit
      endif
       x=0
    enddo
  if upper (chr(x)) $ "C"
      clear
      close all
```

```
        return
endif
    clea
    warn="DO NOT DISTURB PRINTING IN PROGRESS"
    @13,(80-len(warn))/2 say warn color "w+*/r"
      set device to print
      fouter="NIGER STATE RURAL ELECTRICITY BOARD, MINNA."
    souter="REPORT ON ALL 11KV (ITC) TRANSMISSION LINE"
      @01,(80-LEN(fouter))/2 say fouter
      @02,(80-LEN(souter))/2 say souter
      @04,01 say "S/NO"
      @04,06 say "ITEM CODE"
      @04,16 say "DESCRIPTION"
      @04,44 say "UNIT"
      @04,50 say "QTY"
      @04,60 say "PART"
      @04,70 say "AMOUNT"
      @05,01 say repl ("=",77)
    xpage=1
    row=06
    mrow=62
    xsno=1
    go top
    kounter=35
    adder=0
    xamt=0.00
    xamt1=0.00
    set filter to xparty=xpart
  do while .not. eof()
    if row>mrow
      eject
      clear
      xpage=xpage+1
      row=06
      fouter="NIGER STATE RURAL ELECTRICITY BOARD, MINNA."
    souter="REPORT ON ALL 11KV (ITC) TRANSMISSION LINE"
      @01,(80-LEN(fouter))/2 say fouter
      @02,(80-LEN(souter))/2 say souter
      @04,01 say "S/NO"
      @04,06 say "ITEM CODE"
      @04,16 say "DESCRIPTION"
      @04,44 say "UNIT"
      @04,50 say "QTY"
      @04,60 say "PART"
      @04,70 say "AMOUNT"
      @05,01 say repl ("=",77)
    endif
    xitemcode=itemcode
    xdesc=desc
```

```
          xunit=unit
          xqty=qty
          xrate=rate
          xpart=part
          xamount=xrate*xqty
          @row,01 say xsno      pict "9999"
          @row,09 say xitemcode pict "999"
          @row,16 say xdesc     pict "@!"
          @row,44 say xunit     pict "@!"
          @row,50 say xqty      pict "999"
          @row,61 say xpart     pict "!"
          @row,66 say xamount   pict "9,999,999.99"
          clea
          xamt=xamt+xamount
          skip
                  xpart=part
          xsno=xsno+1
          row=row+2

          if eof ()
            xsno=1
            *xamt=xamt+xamount
            row=row+1
            @row,01 say repl ("=",77)
            row=row+1
            @row,05 say "SUB TOTAL OF PART  "+ " " +xparty
          @row,60 say xamt pict "9,999,999,999.99"
            row=row+1
            @row,01 say repl ("=",77)

            sele 1
            skip
            xparty=part

            sele 2
            set filter to xparty=xpart .
          endif
        enddo
        eject
        use
        set device to screen
jobend="REB HAS COMPLETED PRINTING JOB, Press Any Key To Continue..."
clear
@23,(80-len(jobend))/2 say jobend
set cons off
wait " "
set cons on
clea
return
```

CHAPTER FOUR

4.0 SYSTEM IMPLEMENTATION

This is a stage in system development cycle where all the activities carried out as outlined in chapters 1 to 3 are consolidated. At this stage a new system has been developed, the next step is to determine the procedure by which the new system can replace the old one. In this case the existing system was the manual method of estimation, stock requisition and issuing, and general project management. For a smooth changeover to take place the following activities should be considered ;

Conversion,	Program Testing,
Training ,	Program Debugging.
Installation.	

4.1.0 System Conversion

The aim of system conversion is to recommend to the user of the system suitable method by which the organisation's operation will shift from the old to the new system, there are quite a number of ways by which this can be accomplished depending on the situation at hand, for example a changeover approach for an existing computer based system to another improved computer based system will be quite different from a changeover from a manual system to a computer based system. A list of methods that can be applied and a brief explanations on their application now follows from which a choice can be made.

Parallel Approach : In this approach both the old and the new system are run simultaneously, This is done for a short time from where the user is made to appreciate the new system and gradually shell off the old system giving way for the new system until a time when it will be

the new system only in operation. This method is applicable most especially in a situation where the retained personnel has no experience on the new system at all.

Phase by Phase: This approach will permit the user to apply the new system to only a section of the organisation's operation at a time, while the rest operation is run on the old. By the time the first section's operation proves to be compatible with the new system, then another section can be considered. There would therefore be a gradual shift from the old to the new system.

Direct Change over: In a direct change over it is assumed that the computer personnel are computer literate and vastly experienced in the field, and that a high confidence is reposed on the system developed with no iota of doubt on its performance. In that case a swift and immediate changeover is advisable.

Pilot Approach: In this method, a working version of the system is implemented in one of the sections of the organisation, based on the result obtained from it necessary changes are made. Then the installation of the system for the whole organisation would be effected either all at once or gradually.

The choice: After a careful study of the above submissions, the designer of this work has recommended a parallel change-over approach. First for the simple reason that the newly converted personnel are not experienced and secondly that the system need to be applied for a period between 6 month to one year after which it will undergo some maintenance designed to make remedy on whatever deficiency that might have been discovered during the period of use.

4.2.0   __TRAINING__

It can be recalled that in chapter one (feasibility studies), it was put forward that the same

member of staff in the monitoring department be maintained as the end user of the system, in

line with this there will be need to train at least two middle level officers on the application of

the system. The two officers so trained can thus pass on the idea to other members.

The followings are the Areas the training's will cover.

- Computer Appreciation

- Windows '98

- word-processing

- Spreadsheet

- Ms DOS, PC. DOS

- Element of Dbase iv

- The application of the new software

- Element of computer Installation and Maintenance

The computer appreciation and other basic aspect of the training are included because of the

understanding that we are ascending from a state of no computer (manual) to a state of

computerisation, The user is assume to have no relevant experience and must therefore be

brought to a level of appreciating the computer system.

The Word-processor, Spreadsheet, Desk top Publishing Packages are included to give the user

a wider range of utility. The basic, Dbase IV, is included to enable then to have idea on system

maintenance . Although it is not expected of the user to make any modification on the Program

without the prior knowledge of the system designer, This is to forestall destruction to the

software by an amateur.

It is however necessary at this junction to pointify the fact that a large system will require more than just a few staff, the following areas must be fully staffed and therefore training of all concerned is mandatory.

- Data Preparation Personnel

- Data Control Personnel

- Data Entry Personnel

- Computer Operators

- Librarian

- Middle Level Officers (Supervisors) e.t.c.

This arrangement is suitable, apart from the training of the individual on a specific function, it also help in defining the role expected of individual and therefore responsibility will not overlap.

4.3.0   INSTALLATION

Broadly speaking installation can be classified into two main parts, the first is the hardware installation while the second is software installation.

Hardware Installation: The responsibility of hardware installation falls on the shoulder of the System Engineer or the Vendor i.e. if the organisation hasn't got a system Engineer (in that case the term of contract with the vendor should include system installation).

Earlier on in this article recommendation was made for the computer room , This should be an expansive 16ft by 16ft room , fitted with 2 no ,2 H.P Air-conditioner, The room should be moderately furnished as well. A compartment must be built to house the computer. The description is as follows; A reading table size cubicle having two drawer each on the two

sides. The monitor and the Processor's sit must be provided with a two door safe. The cubicle must be made of a very fine wood with a good finishing.

Apart from the installation of monitor, processor, and the printer, other add ons includes the sound speaker, and Modems. The ups and voltage regulator should also be mounted.

One very vital point to note at the time of installation is that for each computer peripheral hardware installed, a software must exist for it (i.e. the driver). For example before a user can make use of a printer its software must have been installed on the computer's hard disk. So it is for modem, e.t.c.

4.4.0   SOFTWARE INSTALLATION

Most IBM and IBM compatible machines supplied this days comes handy with the window 95 or window 97 operating system . The more of other software installed will depend on the request of the buyer. For this project work, installation of the following software has been suggested (in addition to the software developed for this project) These are Word-processing packages like , Word-perfect and Word-star. Other packages to be installed include Lotus 123, Corel draw, Harvard graphics, Borland Dbase iv, Clipper, Foxpro, Qbasic, and computer appreciation packages like Internet explorer e.t.c. The program developed for this system will be a free standing one since the dbase4 program was compiled using clipper. The installation diskette provide a means of transferring the project work to drive C.

4.5.0   SYSTEM TESTING

As the saying goes "The proof of pudding is in eating", so it is with the system development too. After coming this far, there is a need to verify and convince ourselves that what has been done so far is justifiable, this is done under the system testing procedure.

Basically, in system testing, it is the intention of the designer of a system to exercise the program written by using data which is similar to the real data on which the program is design to execute. Observations are made while testing is going on, anomalies are recorded, so that at the end of the testing a report on the performance are then collated.

Another way of looking at the tests is to consider it as a destructive process, by this it means to say that some aspect of the test will be a deliberate introduction of such data that are not meant for the program and see if the program will recognise the aberration. This is done to prove its processing limits and also to ensure its perfect performance within the bonds of its program.

Program Testing Tools: There are software written by the software houses to help a programmer to test his work. The variance for this is as follows:

- Test Data Generator
- Execution Flow Summaries
- File Comparators

Test data generator will be given some explanations here,

Test data generator : This is a program which automatically generates large number of test inputs for the system under consideration. They are more useful in situations where the performance of the system in a practical environment must be tested. This implies the subjection of the system to a practical large data (especially the type to be met when the system comes to full use)

This project has been tested using an approach similar to test data generator, but here the data were arbitrarily generated by the designer, In the cause of testing the program however some errors were detected, take for instance one of the report printed out did not conform with the

intended output specifications, the designer has to go through the whole of the procedure responsible for that report and in doing so the error was detected.

Test stages

Having selected a tool for testing, the next step is the commencement of the test proper. the test will be in stages. the following are the stages to follow:

Function test: At this basic level of testing, the functions making up a module are subjected to test in a bid to ensure that they are correctly coded.

Module Test: A number of functions constitute a module ,It is a unit of program designed to perform a particular task. In this program for example a module will print out report on 11 kV transaction, another on 33kv transaction etc. The tests were carried out on these modules. A few errors were detected which were later on corrected.

Subsystem tests: A number of module makes up a subsystem. These related modules are put together and tested. The aim of the test is to observe the adequacy of their interaction.

System tests: All the functions, modules and subsystems make up the system. The system as a whole was tested with the test data, and where minor malfunctions were detected they were promptly corrected.

4.5 .0   **PROGRAM- DEBUGGING**

This is related to program testing in that it relies on test result which signify the presence of error. Debugging is therefore the process of identifying those areas of the program which contains errors and modifying them to correct the errors.

The process taken in debugging the errors in this work is as thus: Notes from the tests stages were collected together, then actions were directed to locate those part of the program code that were erroneously coded as indicated by the notes. Correction were made on such codes, and after all the corrections, the program was tested again to ensure that they now comply.

CHAPTER FIVE

5.0   SYSTEM DOCUMENTATION AND MAINTENANCE

This chapter deals mainly with documentation and maintenance. Documentation pertains those articles of literature put together to aid the user in operating the system smoothly and carrying out maintenance with ease. The documentation is of two parts viz.; User documentation and system documentation, (each of this will be discussed in this chapter as it relate to the system development) Maintenance on its own part gives a guideline on what to do when the user runs into any operational trouble.

5.1   USER DOCUMENTATION

User documentation tailors the mind of the user to the step requires to be taken to step up the package, and when eventually it is set-up the document helps the user to navigate smoothly into different segment of the package. Explanations are also provided on each section and sub-sections. Figure 3.1 is used in making the analysis.

5.2   THE MAIN MENU

Figure 3.1 will be useful in explaining the operations of the package via the menu. This comprise of the main menu, pull down menu and dialogue boxes as identified in the diagram.
The mainmenu consist of four headings, each of which perform a special role. These heading include; Cost manager, Reference file. Report, Utility, and Exit.

Cost Manager; In this section, Transactions are made, It could either be in 11kv, 33kv, or on TDN. Thus we have three options which can be pulled down individually and used, The choice depend on the user.

Reference file; Before any transaction can be made at all there has to be guidelines and coding of the items. Reference file deals with the stock coding and partial data entry for both ITC and TDN. It is with the work done in this section that the transactions are made . Password is another option that can be made in this file. This section as a whole has five pull down menus to work with.

Report; The result of the transaction can be summarised in this area called report. Reports are given on transactions involving either ITC or TDN. If we desire to have a report on the coding made

in the reference file such a report can also be generated . The processed report can be directed to the printer or may be stored in a separate file.

Utility; Is a portion in the package that permits the user to make an introductory notes on what the package is designed to do, There is also a brief history of the author.

Exit the main-menu. This takes the user out of the package environment back to the system prompt.

5.3   PULL DOWN MENUS AND DIALOGUE BOXES

A: Referring to fig. 3.1 this is the 33kv ITC transactions. With this option it is possible to Create a new file, Modify, View and Delete a file or record as may be required. Exits from this portion return ones to the main menu.

B: level b in the figure represent transaction in 11kv ITC work.Like the case with level A new file can be created, Modification, Deletion and a view of existing fields and record is also possible.

C: Level C represent TDN work, like in the case of ITC activities like create, view, modify and deletion is possible. An exit from this section take the user to the main menu.

D: Stock coding is a portion where data entry is made, for example: A Tension clamp can be assigned 100. Such that a unit price is assigned to each item so coded.

E: Password : If a password is coded it is capable of disabling an intruder from having an access into the files.

Exit the main-menu: This takes the user out of the package environment back to the system prompt.

F   Report on item coding is capable of summarising item coded so far and it could direct such information to the printer. A change of mind on this takes the user out of the menu to the main menu by simply clicking "QUIT".

G   **Report on 33kv transactions:** This is as in F above and the output can equally be directed to the printer.

H   Report on an ITC 11kv transaction is made possible here.

I   Report on TDN transaction and printing of such report, note here that P stand for print while Q stand for quit the Menu.

LEVEL 1,2,3,4

At the levels designated with figures above, the activities performed are as follows:

Level [1] = Creating new file

Level [2] = Modification of the existing file

Level [3] = Viewing

Level [4] = Deletion

5.4   OPERATOR'S GUIDE:

This is a quick short cut for the operator to get over minor problems that are bound to occur in the process of carrying out day to day activity. A list of possible fault is given below and a possible cause / remedy of such is also suggested. Some of which are:

)   power failure.

)   Lack of supply to computer system.

)   Loss of data. ...

d)   Denial of access.

e)   Failure in savings.

Lack of signals from keyboard etc.

a)   **Power failure:** It was suggested in chapter two that the computer room be wired with three phase supply even though the system operates under single phase, whenever a phase is off, the operator can make a change over to another phase through the change over mechanism. Better still the portable Gen. Set can be energised to power the system in care of total power out stage from the supply authority.

b)   **Lack of supply to computer system:** some time it may occur that a system is put on but it refuses to pick, i.e. the indicators are not showing signals at all. This is a power problem.

The operator should check cable connections to the ports, and should close all pins. If the problem persist he should check the socket outlet and then the relevant supply fuses. If however the problems persist let him invite a technician.

Loss of data: A user must strive as much as possible to disallow the occurrence -of loss of data, otherwise the whole essence of computerising is defeated. He must know that loss of data occurs due to the following reasons, which he must safeguard against:

- It could be that the user intends to but do not actually save the said data, Though this is a sort of carelessness.

- Loss of data could occur if a user mistakenly delete a field or record he did not intend to, For a given file so erroneously deleted the file returns to the recycle bins and can be recalled if so desire. If the file is however deleted at the recycle bins pain then the file is lost forever.

 Such file may require a pass-word , without such a pass-word access will be denied, therefore the analyst should be able to give necessary guidance as to what pass-code is used.

- Sometimes too, the operator may have boot his system in drive C only to start searching for information on drive A without effecting the changes, He will not be successful in the search. It do occur sometimes too that the operator is not quite sure where the information is stored, in such a case it is advised that the find fast facility of the computer be employed.

- Some files are in a sub directorate. A definite path has to be taken before such file are reached, the user must be conversant with file location procedure

 Failure in savings:- The used may found out that despite the fact that right command is issued, his work is not really store-up, and that he has to retype a whopping 20 pages work for instance. The user can guide against this by ensuring that "write protect notch" is on and then making it write – enabling.

f) **No signal from key board:-** If the system is booted up and you realise that there is no signal from the key board the following action can be taking

 i) Re-fix the keyboard to motherboard connection, you can test the efficacy of the cable in an extreme case.

 ii) Check the interface of keyboard/ motherboard and connect the anomaly.

 iii) In some cases too the keyboard may have gone bad. Invite a hardware technician to carry out the repairs.

5.4   SYSTEM DOCUMENTATION

The system documentation tells the user the followings;

What leads to the creation of the system

Feasibility study on the system .

The system specification .

The analysis of the system .

The design of the system.

Implementation in terms of -flowchart diagrams and

coding the program in a particular language.

Testing and debugging of the program.

All these are well spell out within chapter one to four ,and these constitute system documentation. However the most essential aspect of the document are those on the analysis and design . The document serves as a guide to the user of the system, More importantly the document serves as a reference to the analyst and programmer when ever a need arises for the maintenance of the system .

5.5 MAINTENANCE

Following a careful analysis and design a system has evolved , To the best of the designer the system is concise and precise. Unfortunately the system is susceptible to being faulted, First a system test may reveal some shortcomings and thus there will be need to correct such deficiency , is is one aspect of system maintenance largely refer to as corrective maintenance. Another area here maintenance will be required is when the user begin to apply the package and at a point he feels something should be incorporated into the system , He will thus intimate the system analyst who will arrange for a perfective maintenance.

Adaptive maintenance is another area whereby maintenance of a system's program may be carried out, Adaptive is required when the environment at which a system is operating changes ,and therefore a need arises to adapt to the situation .

for this project work the first aspect of maintenance is applied i.e. corrective maintenance ,The perfective and adaptive maintenance is left for the user and the future.

.6   CONCLUSION

At the beginning of this project work ,the issue at stake was to produce a system whose reliability, efficiency and cost benefit will be better than the existing manual procedure . A system has thus been developed , from the outcome of this work it is evidence that the system provides a qualitative and reliable information databank where transaction on 11kv, 33kv,and Tdn can be done with ase.This make such transaction simple faster and ofcourse reliable. Reliability is attained through uch facilities like sorting procedure,modification,deletionfacilities etc. It is believed that this ackage will go a long way in assisting Engineers in preparing bill of quantity for the transmission ne constructions.

.7 RECOMMENDATION

The author of this work wishes to make the following recommendation to whoever will like to ontinue the research work from here : That the initial design of the work includes the project nanagement, this was to include the payment system to the vendor,stock management,and progress port of the project. Sincerely due to limitations of time and resources this area was not covered d it is suggested that further research be commenced from here.

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