COMPUTERISING PROGRESS REPORTS IN THE HIGHWAYS DEPARTMENT OF THE FEDERAL MINISTRY OF WORKS AND HOUSING

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APPROVAL SHEET

This project has been duly supervised, examined and found acceptable in partial fulfilment of the requirement for the award of the Post-Graduate Diploma in Computer Science of the Federal University of Technology, Minna.

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DATE

DEDICATION

THIS PIECE OF WORK IS DEDICATED TO MY LOVING WIFE, MRS HELEN ADAEZE OSAKWE FOR HER UNDERSTANDING AND SUPPORT,

AND TO OUR CHILDREN - OBINNA, ADORA, CHIBUZO, UJU AND CHIOMA FOR THE JOY THEY HAVE BROUGHT TO US.

ACKNOWLEDGEMENT

This project perhaps may not have been successfully completed without the positive influence of a number of people. I owe each and everyone of them a lot of gratitude.

I give thanks first and foremost, to the Almighty God whose abundant Grace and Mercies have seen me through this course.

I wish to specially thank my project supervisor, Professor K.R. Adeboye whose critical evaluation and scholarly judgement guided me throughout the writing of this project. I cannot thank him enough. I also would like to place on record my appreciation to the co-ordinator of this programme, Mr. R.O. Badmos whose personal and friendly advice was of immense benefit.

This piece will not be complete without my thanking the Head of Department and all the lecturers of the Mathematics/Computer Science Department for the wonderful way they handled this programme and above all for their patience with all of us, the matured students.

I am deeply grateful to my loving wife, Mrs Helen Adaeze Osakwe for her moral support and encouragement while this course lasted.

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To all my friends who contributed in one way or the other to the success of this project, I say a big thank you.

Finally, permit me to humbly state that the success of this project has also been partly due to my effort and interest in the programme. Thank you.

Engr. A.M. Osakwe

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ABSTRACT

The Federal Ministry of Works and Housing is charged with the provision and maintenance of roads, public buildings and some other services.

The Federal Highways department is one of the eight departments of the ministry. This department is responsible for the planning, design, construction, maintenance and management activities of all federal trunk roads and bridges as well as regulation of traffic on the road network.

Road projects in this department, be they construction or maintenance contracts require monthly progress reports. Until now, these reports have been done manually hence the need to computerise.

CHAPTER ONE

1.0 BACKGROUND TO THE STUDY

1.1 INTRODUCTION

Owing to the enormity of the responsibility of the Highways department of the Federal Ministry of Works and Housing, it is mandatory for field officers to produce progress reports on all their activities on a monthly basis. These activities could cover construction, maintenance projects like rehabilitation works, emergency or special repairs and even direct labour works.

The monitoring units armed with these progress reports find it easier to check the executed works.

On a major project with a contract period of 30 months for instance, one requires 30 monthly progress reports. It is in consideration of the above, that the need to computerize this aspect of the job has arisen.

1.2 AN OVERVIEW OF F.M.W. & H

The Federal Ministry of Works and Housing is one of the many ministries that make up the Federal Civil Service in the Country. This ministry was formed out of the metamorphosis of the Public Works Department (PWD) of old. It has a staff strength of about 40,000 scattered in all parts of the federation.

In 1979, part of the ministry, the Housing department specifically was removed to form the Housing and Environment Ministry. By 1984, this same department was made part of the Federal Ministry of Works, thereby renaming

the ministry as Federal Ministry of Works and Housing. It has remained so since then.

In order to be able to discharge its functions properly, the ministry is divided into eight major departments namely:

1. Highways Department
2. Public Building and Housing Department
3. Engineering Services Department
4. Surveys Department
5. Lands, Urban and Environment Department
6. Personnel Department
7. Finance and Supplies Department
8. Planning, Research and Statistics Department

Each of these departments is headed by a director and is responsible for some aspects of the ministry's functions. The first five of these departments are operational while the last three are service departments.

1.3 OBJECTIVES OF F. M. W. & H

The objectives of this ministry can easily be seen from the functions of the various departments. The functions of the departments are as follows:-

HIGHWAYS DEPARTMENT

Responsible for the planning, design, construction, maintenance and management activities of all Federal trunk roads and bridges.

PUBLIC BUILDING AND HOUSING DEPARTMENT

Responsible for provision and maintenance of public buildings and housing in various parts of the federation.

ENGINEERING SERVICES DEPARTMENT

Responsible for mechanical and electrical works and erosion control matters in the ministry.

SURVEYS DEPARTMENT

Responsible for the delineation of local, state and international boundaries as well as the production of maps.

LANDS, URBAN AND ENVIRONMENT DEPARTMENT

Responsible for all land acquisition and compensation matters, Urban and regional matters as well as landscaping.

PERSONNEL DEPARTMENT

Responsible for all personnel matters.

FINANCE AND SUPPLIES DEPARTMENT

Responsible for the ministry's finances and all store matters.

PLANNING, RESEARCH AND STATISTICS DEPARTMENT

Responsible for the collation of all data in the ministry.

1.4 ORGANISATION STRUCTURE OF FEDERAL MINISTRY OF WORKS AND HOUSING

The Federal Ministry of Works and Housing is structured in line with the Civil Service Decree (No. 43) of 1988. The eight departments arising from this

still exist although the decree has been abrogated. Please see the Organisational Chart I below.

The Honourable Minister is the Chief Executive followed by the Minister of State, then the permanent secretary. The eight departments made up of 3 common services departments and 5 operations departments function under the minister and permanent secretary.

The 3 common service departments are:

(i) Personnel Management

(ii) Finance and Supplies

(iii) Planning, Research and Statistics and the 5 operations departments are:

a. Engineering Services

b. Federal Highways

c. Lands, Environment, Urban and Regional Development

d. Public Buildings and Housing

e. Federal Surveys

From the name, the common services departments service and facilitate the activities of the Operations Department which are basically policy initiation and projects execution. Each of these departments is headed by a director on GL 17.

Each department is further broken down into divisions to reflect broad professional areas. The Highways Department is sub-divided into 9 divisions namely:

a. Development Division

b. Multi - Lateral Loans Division

c. Staff Development Division

d. Management Service Division

e. Zonal Highways Management (South West)

f. Zonal Highways Management (North West)

g. Zonal Highways Management (South East)

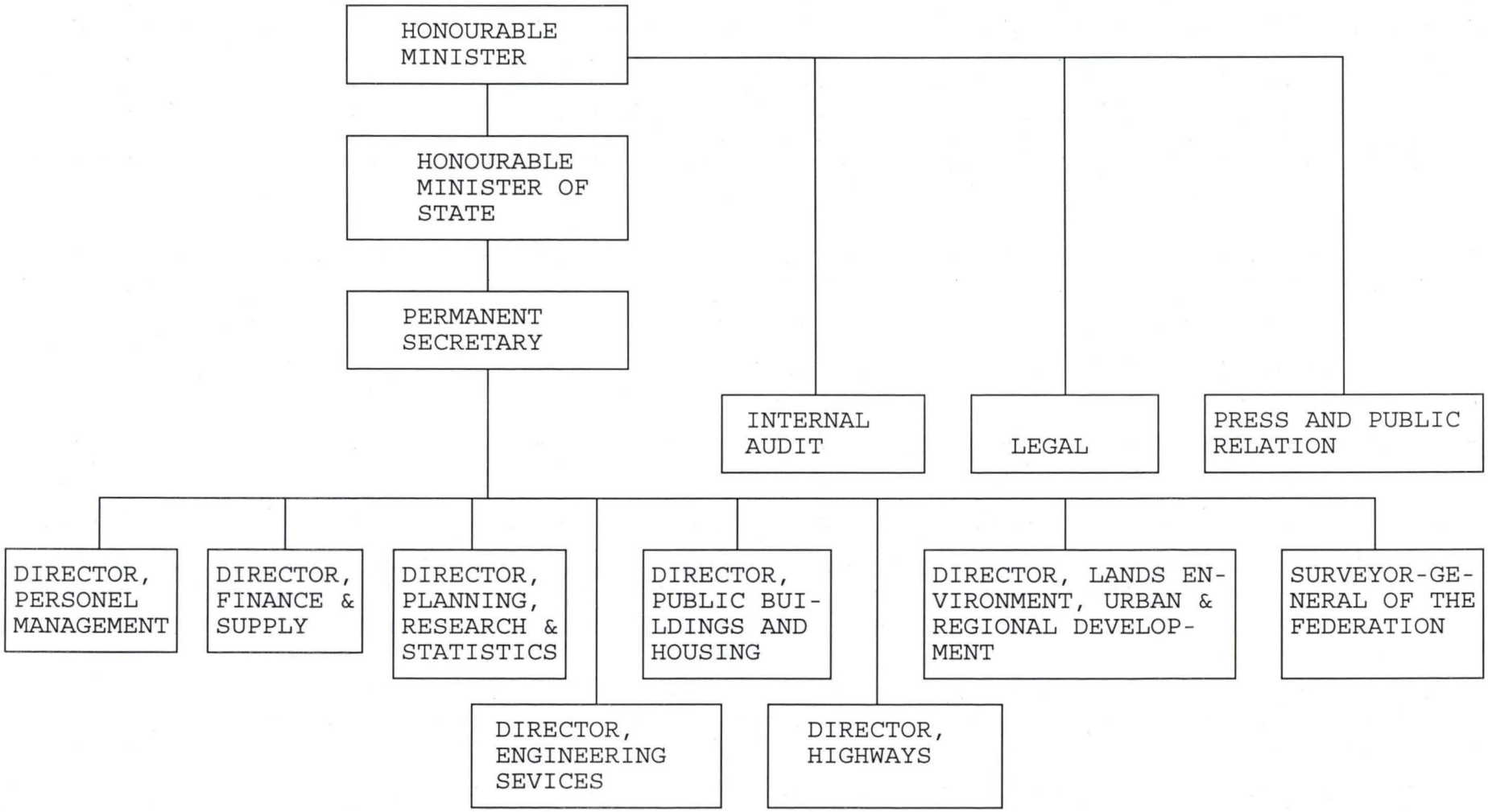
h. Zonal Highways Management (North East)

i. Zonal Highways Management (Central)

Each division is headed by a deputy director on GL 16. A vertical structure of a typical department is as shown in Organisational Chart II.

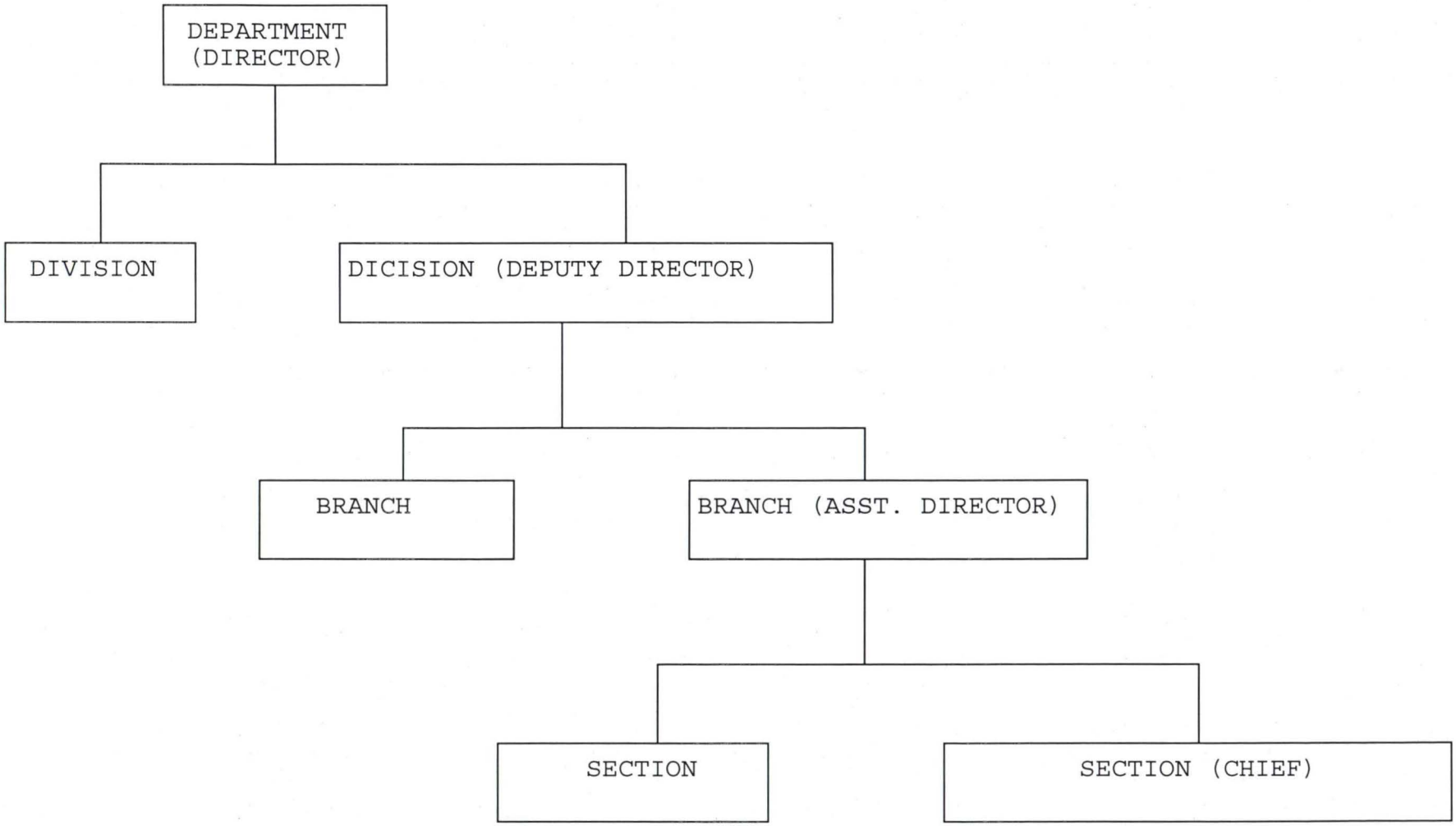
ORGANISATIONAL CHART I

ORGANISATIONAL STRUCTURE OF FEDERAL MINISTRY OF WORKS AND HOUSING



ORGANISATIONAL CHART II

VERTICAL STRUCTURE OF A TYPICAL DEPARTMENT



1.5 OBJECTIVES OF THE STUDY

The objectives of this study is to see whether by computerizing the progress reporting system of the Federal Highways Department of the Federal Ministry of Works and Housing, the following can be achieved:

i. Less time can be spent on preparation of progress reports

ii. An accurate data base can be established

iii. Quick and easy reference to the records

iv. Easier modification of reports.

1.6 METHOD OF DATA COLLECTION

Normally data for progress report are collected from measurements on site for any Highway project. In this particular case, the data being used are those of a previous project.

The data are normally in the form of quantity of a particular item of work accomplished within a period of one month. Usually, the items of work considered are:

a. Site clearance and earthworks

b. Sub-base material

c. Base course material

d. Concrete and Culverts

e. Bridges

f. Surfacing

g. Any other Works

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 UNDERSTANDING CIVIL ENGINEERING

Engineering is the art or the application of science for directing, checking or instructing in the utilization of the principle, forces, properties and substance of the nature in the production, manufacture, construction, operation and the use of things or means, methods, machines, devices, structures etc. (A. N. Kiddle - 1918).

It could also be defined as the practice of safe and economic application of the scientific laws governing the forces and materials of nature by means of organising design and construction for the benefit of mankind (S. E. Lindsay - 1920).

T. J. Hoober went ahead in 1914 to define Engineering as the professional and systematic application of science other than purely manual and physical work to the utilization of natural resources to produce comfort and wealth.

Civil Engineering therefore, is the branch of Engineering that deals mainly with the design, construction and maintenance of public works such as buildings, bridges, roads, tunnels, towers, masts, water resources structures etc.

2.2 HIGHWAYS ENGINEERING

Highway Engineering is one of the most important branches of Civil Engineering. It covers the planning,, design, construction and maintenance of different kinds of roads.

Roads are to the country what veins are to the human body. They serve to link up various parts of the country. There are several types of roads depending on the final surfacing. There can be earth roads, surface dressed roads, asphaltic concrete roads, concrete pavements etc.

Any good road must have drainage structures in the form of pipe and box culverts, earth drains, concrete line drains, bridges and turn outs etc. All these come under this branch of Engineering.

2.3 FUNCTIONS OF THE HIGHWAY DEPARTMENT

The major function of the Highways department is the planning, design, construction and maintenance of the Federal road network in the country. As stated earlier, there are 9 divisions in the department. Each of these divisions has a specific function.

i. <u>DEVELOPMENT DIVISION</u>

Handles all matters of policy and the procedures for the development of new roads and the up-grading of existing ones. It undertakes all pre-contract work for new roads, bridge projects and the up-grading of existing ones.

ii. MULTI - LATERAL LOANS DIVISION

Manages projects under the Highway sector loan in addition to rendering project management services to multi-state road projects.

iii. MANAGEMENT SERVICES DIVISION

Renders management services for the department, in much the same way as the corporate affairs office in an organisation.

iv. ZONAL HIGHWAY MANAGEMENT DIVISIONS

Each of these 5 divisions monitors the serviceability of the existing road network in the zone, handles pre and post-contract work for minor projects and concentrates on post - contract work for major projects.

v. STAFF DEVELOPMENT DIVISION

Handles all training and staff development matters.

2.4 PROGRESS REPORT ON HIGHWAY PROJECTS

Progress reports on highways projects are prepared on monthly basis. A typical progress report will contain information such as the project title, contract No., contractor, contract sum, project length, commencement date, completion date, contract period, the particular month and scope of works.

All the items listed above are self - explanatory and the scope of works gives a summary of what the project is all about and the different works to be carried out.

The percentage of completion of the project and the lapse of contract period are computed in each progress report. This gives an indication of how well the contractor is achieving the set target.

A typical progress report is attached for further explanation.

2.5 PROBLEMS ASSOCIATED WITH THE PRODUCTION OF MONTHLY PROGRESS REPORTS

The major problem associated with the production of progress reports is the fact that each time, all the computations must be repeated. Errors may arise while computing the weighted percentages.

The shading of the chart is another problem because for each new progress report, a new chart will be produced and normally many copies of the report will be required.

2.6 THE NEED FOR COMPUTERIZATION

There is a great need to computerize the progress reporting system of the Highways department of the Federal Ministry of Works and Housing. Instead of starting all computations for the percentage completion and the weighted percentages from scratch each time, a data base will be created and once the new measurements for the month are known, the computations will be updated in matter of seconds.

A lot of time will be saved in preparing progress reports on the computer. The shading of the charts will be done easily.

Computerizing will also reduce or totally eliminate the chances of errors in computation of the completion percentages.

CHAPTER THREE

3.0 SYSTEMS ANALYSIS AND DESIGN

3.1 INTRODUCTION

Systems analysis and design is the process in which information on the system is collected, analysed and transformed into physical and logical design of a new system. The collection and analysis are expected to be done appropriately because they constitute the basis of the design of the new system.

Given the above information, this chapter covers the description of the existing system, the design of the proposed system, the choice of language, the features of DBMS, the input and output formats and the database files require for the new system.

3.2 THE DESCRIPTION OF THE EXISTING SYSTEM

The existing system is manually operated. This is done such that the monthly progress report is calculated as the need arises. In this case, information about all the maintenance and construction works that are currently executed are stored in their respective files for future access.

However, the problems being currently faced by the Federal Highways Department are in terms of loss of important information, difficulties in assessing information, computational error and others necessitated the need for computerisation.

3.3 THE DESIGN OF THE PROPOSED SYSTEM

As stated above, the proposed system is a computerised procedure of storage and retrieval of the monthly progress reports. This will involve the design of a system using any of the available computer languages and programs that will provide enough facilities for achieving the required objective of the system.

The proposed computerised system will be designed to be users friendly. In this case, the system will present a menu structure which will represent various task and operations that can be performed with the system. In addition, the mode of interaction by the users will also be provided at various point of usage of the system.

Basically, the design will mainly be a dialoguing system in which the system will present various options to the users for selection, the system will then prompt the users for appropriate action to be performed.

3.4 CHOICE OF LANGUAGE

For the purpose of flexibility, the proposed system will be designed using Database Management System (DBMS).

A DBMS is a software that maintains and manipulates the content of a database. It also provides the interface between the user and the data in such a way that it enables the user to record, organise, extract, summarise and report on the data contained in a database. However, a database can be defined as a mechanised, shared and centrally controlled collection of data used in an

organisation. It is regarded as a collection of useful information organised in a systematic and consistent manner. A database can also be regarded as a databank.

The use of DBMS in software development requires database files as a means of data storage. In this case, the data in the file are organised into rows and columns with each row making up a record while columns represents fields in the database file.

3.5 FEATURES OF DBMS

The overall objectives for the development of database technology is to treat data as organisational resource and as an integrated whole. DBMS allows data to be protected and organised separately from other resources (e.g. hardware, software and program).

In order to achieve these objectives, the database technology was designed with the following features:

i. DATA CO-ORDINATION AND ACCESSIBILITY

In a database processing environment, information from several files is co-ordinated, accessed and operated upon as if they are contained in a single file. In this way, database technology allows for logical centralization of information even though, the data may be physically located on different devices. Therefore, the database technology allows the users to gain valuable information by linking data across the organisation.

ii. ELIMINATION OF DATA

Data redundancy is the duplication of similar data in different files. This duplication leads to wastage of storage space and duplication of efforts during data entry and modification. The basic features of DBMS in this regards is that it does not allow for duplication of data storage. In order to achieve this, the technology requires the use of Data Modelling tools such as Normalisation and Courting techniques.

iii. DATA INDEPENDENCE

With the introduction of database technology, software development requires data to be separated from the application program. This feature of DBMS enables the users to modify the application program without necessarily changing the data and vice versa.

iv. MAINTENANCE OF DATA INTEGRITY

Data redundancy can lead to lack of data integrity and a common feature of this is inconsistent information. This means that the information generated by the data processing system would no longer be trusted. However, since the database technology does not allow for data duplication, the possibility of having different entries for similar data is completely removed. Hence, this practice ensures the integrity of data.

v. CENTRAL COLLECTION AND CONTROL OF DATA

This is an important feature of DBMS. In database environment, data and operations on data are centrally controlled. This leads to better management of data because it allows for proper security of information stored.

3.6 INPUT DATA AND FORMAT

The proposed system is designed to process data supplied to it by the users. There are three categories of data required into the system which are:

i. Detail of Project

ii. Monthly Progress Details

iii. Information about Schedule Items

For the project details, the required information includes:

i. Project Number

ii. Project Description

iii. Contractor's Name

iv. Contract Sum

v. Project Length (road distance)

vi. Commencement Date

vii. Completion Date

viii. Contract Period

ix. Scope of work

The monthly progress details contain information about the progress of work on monthly basis. The basic data requirement for this purpose are up-to-date information on the relevant schedule items such as:

i. Site Clearance

ii. Earthworks

iii. Grassing

iv. Pipe Culvert

v. Box Culvert

vi. Drains

vii. Cover Slab

viii. Turnouts

etc,

Information about schedule items contains the details about each item such as:

i. Schedule item number

ii. Schedule item description

iii. Unit of measurement

iv. Rate

All the above categories of data are to be presented in a form which will always prompt the users for data entry.

3.7 THE NATURE OF DESIRED REPORTS

Basically, there are two types of reports required from the proposed system. They are:

i. Monthly Progress Report

ii. Progress Chart

The monthly progress report is the report that shows the full information about a project. In addition to the project details it contains, there are also information about the progress of a project in terms of work and financial expenditure committed so far. The progress chart is the graphical representation of the progress report. It is used to display the progress of work using the relevant schedule items graphically.

3.8 DATABASE FILES DESIGN

For the sake of data storage, the proposed system requires four files which are:

i. PROJECT.DBF

ii. ITEM.DBF

iii. STATUS.DBF

iv. GENERAL.DBF

PROJECT.DBF

This is the database file that contains detail information about all the projects which are currently being undertaken by the Department. The structure of this file is as follows:

S/No	FIELD NAME	FIELD TYPE	WIDTH	DECIMAL
1.	Prjno	Character	5	-
2.	Contno	Character	5	-
3.	Date1	Date	8	-
4.	Date2	Date	8	-
5.	Prjdesc	Character	40	-
6.	Contnm	Character	40	-
7.	Contpd	Numeric	6	-
8.	Contsum	Numeric	15	2
9.	Prjlgth	Numeric	9	-
10.	Scope1	Character	50	-
11.	Scope2	Character	65	-
12.	Scope3	Character	65	-
13.	Scope4	Character	65	-

ITEM.DBF

This is the file that contain all the relevant information about the available schedule items. Information on these items includes item number, description, rate, etc. Its structure is as follows:

S/No	FIELD NAME	FIELD TYPE	WIDTH	DECIMAL
1.	Itmno	Character	4	-
2.	Itmdesc	Character	25	-
3.	Unit	Character	5	-
4.	Rate	Numeric	9	2

STATUS.DBF

Information about the connection of each project with the relevant schedule items are contained in this file. The structure of the file is as shown below:

S/No	FIELD NAME	FIELD TYPE	WIDTH	DECIMAL
1.	Prjno	Character	5	-
2.	Itmno	Character	4	-
3.	Itmdesc	Character	25	-
4.	Quantity	Numeric	11	2

GENERAL.DBF

This file is designed to contain information about the relevant schedule items per project on a monthly basis. Each of the existing project has information similar to the GENERAL.DBF. The structure of this file is as shown below:

S/NO	FIELD NAME	FIELD TYPE	WIDTH	DECIMAL
1	Itmno	Character	4	-
2	Itmdesc	Character	25	-
3	Rate	Numeric	9	2
4	Tqty	Numeric	9	-
5	Tamt	Numeric	12	2
6	Cqty	Numeric	9	-
7	Camt	Numeric	12	2

3.9 PROGRAM SUITE SPECIFICATION

The source program is designed using the concept of modular programming in order to reduce the complexity of the design. Specifically, the new system has about 30 sub-programs which are integrated with a main program which co-ordinates the sub-programs. The program listing of the source program is contained in Appendix II.

CHAPTER FOUR

4.0 SYSTEM IMPLEMENTATION AND APPLICATION

4.1 INTRODUCTION

The development of a software as was done in the last chapter requires its application and implementation. This is required in order to use the system for the purpose its design was intended for.

However, the implementation of a system requires recommendations on the following:

* The proposed hardware configuration and environment required for the newly designed system.
* The required application packages for effective computerisation of the organisation.
* Software testing for the purpose of discovering logic errors.
* The changeover procedure required for the purpose of continuity and reliability.

4.2 HARDWARE REQUIREMENT

The success of the later researches and developments has led to the introduction of computer hardware of tremendous speed, great RAM (Random Access Memory) and high disk storage space. This has made it possible for computer users to have choices from which an appropriate one can be selected in order to further enhance the capabilities of the system.

However, the required hardware for this newly developed software is a computer with the following configuration:

Pentium II 350 MHz

64KB RAM

4.3GB Hard Disk

SVGA Colour Monitor

3.5" Disk Drive

CD-ROM Drive

Windows 95 Keyboard

Mouse & Mouse Pad

Windows 98 Software Pre-installed

The above configuration is recommended so that the speed of the software will be complemented. This will result into a greater efficiency in the organisation's operation as enquiry can be made and the response obtained within the shortest possible time.

Other peripherals required are EPSON Printer and Uninterrupted Power Supply (UPS). The printer is to be used for the purpose of generating the required report from the new system. Specifically, the recommended model of the EPSON printer should not be less than ESPON LQ 2170.

As regards the UPS which is to be used to hold power for a short while, APC Back-Up Pro 720 VA model is recommended for the computer. This has the capabilities of holding on to power for about 30 minutes.

4.3 SOFTWARE REQUIREMENT

The computerisation of the progress reports in the Highways Department of the Federal Ministry of Works and Housing is to further enhance computer aplication in the Ministry. Other areas of computer application that can also be exploited are:

* Text and report preparation
* Calculations
* Data analysis
* Graphical representation of data
* Data storage

For these various purposes highlighted above, ready made application packages can be purchased and installed on the computer. These include the following:

* Word Perfect for Windows
* Lotus 1-2-3 for Windows
* dBASE IV

The Word Perfect for Windows will be used for text and report preparation. Lotus 1-2-3 for Windows will be required for calculations, data analysis and graphical representation of data for the purpose of representing the progress report in charts. The dBASE IV will be used for record storage and the source program modification as the need arises. This becomes necessary because of the dynamic nature of activities in the country. Therefore, as

changes are carried out, necessary modification would be expected on the software.

However, the mode of usage of the recommended application packages would be performed during the training programme which is a necessary task in this computerisation.

4.4 SYSTEMS TESTING

Systems testing is the stage of implementation which is aimed at ensuring that the system works accurately and efficiently before life operation can commence. This involves program testing,

where the program is tested in order to confirm that there is no logic error inherent in the program design. The systems testing also involves testing the system as a whole to confirm its workings.

Specifically, this stage requires both the logical and physical designs to be thoroughly and continually examined to ensure that the new system will work when implemented. It, therefore, serves as a confirmation that all is correct and an opportunity to show the potential users and convince them that all is well with the new system.

Given the above objective, a user acceptance testing was performed on the new system where the users form an integral part of the testing. It was done using a set of carefully selected test data which was entered into the system. The result was compared with the result obtained from that of the manual operation and they were found to be the same.

In view of this, it was observed and concluded that the new system is working accordingly. This, therefore, gives the required confidence for the installation of the systems with the hope and belief that it will enable the Ministry achieve its set objectives.

4.5 SYSTEM CONVERSION AND CHANGEOVER

There are basically three methods of changing over from one system to another. They are:

* Direct changeover
* Parallel changeover
* Pilot running changeover

i. DIRECT CHANGEOVER: This method is the complete replacement of the old system by the new system. The mode of replacement is once. It is always recommended when the computerisation is less complex and not large.

ii. PARALLEL CHANGEOVER: In this case, the old and new systems run concurrently using the same inputs. The outputs are compared and reasons for differences resolved. Outputs from the old system continue to be distributed until the new system has proved satisfactory. At this point, the old system is discontinued and the new one takes its place. This system is very reliable but costly to use.

iii PILOT RUNNING CHANGEOVER: This involves a gradual replacement of the old system by the new one. The bit by bit changeover continues until the old system is completely replaced. Pilot running is always recommended for large computerisation in order to reduce its complexity.

Given the above options, a parallel changeover is recommended for the introduction of this new system because of its reliability and simplicity.

4.6 POST IMPLEMENTATION REVIEW

After the system is implemented and the conversion is completed, provision needs to be made for a review of the system. This involves the maintenance of the system against environmental changes which may affect either the computer or other parts of the computer-based system. This may lead to the improvement of system functions and the correction of faults which arise during the operation of a system.

Specifically, the objectives of the post implementation review is to:

i. Determine whether the system goals and objectives have been achieved.

ii. Determine whether personnel procedure, operating activities and other control have been improved.

iii Determine whether user service requirements have been met, while simultanoeusly reducing errors and costs.

iv. Determine whether known or unexpected limitations of the system need attention.

However, the amendment procedure agreed upon with the use of this system is directly through the users. The users are expected to identify any problem areas or external requirement of the system. Based on this, the system will further be designed to meet the requirement.

CHAPTER FIVE

5.0 SYSTEM DOCUMENTATION AND CONCLUSION

5.1 DESCRIPTION OF THE THE NEW SYSTEM

The execution of the new software package required the installation of dBASE IV into the computer hard disk together with setting up of the source program in a particular directory.

To start the system is as follows:

* Type CD\FMW + <ENTER> Key
* Type DBASE + <ENTER> Key
* At the dot prompt of dBASE IV, type DO MENU + <ENTER> Key.

The execution of the above steps allows the first level menu appear on the screen from which the user would select an appropriate choice.

Specifically, the menu consists of five options as displayed in Figure 1 in Appendix I. The options are as follows:

* Project Description
* Monthly Progress Entries
* Schedule Item Management
* Reports Production
* System Quit

PROJECT DESCRIPTION

This option contains six sub-options as displayed in Figure II. It is used to update the Project File as regards the detail of project under construction. The sub-options are New Project Description for adding record, Change Project Description for editing record, Cancel Project Description for deleting record, View Project Description for displaying a record, List Project Descriptions for displaying all the records and Sub Menu Quit for moving out of the sub-option. The screen design for each of these is represented by Figures III – VII in the Appendix.

MONTHLY PROGRESS ENTRIES

The Monthly Progress Entries is an option used for entry of the progress detail for each of the appropriate items required for the execution of the project. The format of this is as shown in Figure VIII.

SCHEDULE ITEM MANAGEMENT

This option contains six sub-options as displayed in Figure IX. It is used to update the Schedule Item File. The sub-options are New Schedule Item for adding record, Change Schedule Item for editing record, Cancel Schedule Item for deleting record, List Schedule Items for displaying all the records in the Schedule Item File and Sub Menu Quit for moving out of the sub-option. The screen design for each of these is represented by Figures X – XIV in the Appendix.

REPORT PRODUCTION

This is used to produce reports from the system. The system is desired to produce two various reports as shown on Figure XV.

SYSTEMS QUIT

This option is used to move out of the system.

5.2 BENEFITS OF THE NEW SYSTEM

Specifically, the Highway Department of the Federal Ministry of Works and Housing would derive the following benefits from this newly designed system.

i. Enhance efficiency in the operations of the department responsibilities.

ii Avoidance of regular problems such as loss of data which hinders the smooth running of the department.

iii. Creation of speedy ways of generating reports from the system.

iv. Maintenance of data security

v. It allows for the possibility of carrying out major change in the design of the system as the need arises. This is because the new system is fully documented.

5.3 SUMMARY

This project was conceived based on the need to computerise the progress report of the Highways Department of the Federal Ministry of Works and Housing. It was observed that the department has been operating manually,

hence the need for a computer application in order to solve problems emanating as a result of manual operation.

In order to achieve the objective of computerisation, a step by step developmental process was adopted. In this process the analysis of the current system was first carried out and the result was considered in the design of the new system. The consideration of the design is both logical and physical for the necessary requirements to be obtained.

After the design of the new system, the required environment for the system to operate was also considered in terms of the computer hardware configuration and the software installation. The description of the new system which describes the importance of the menu was also described for the purpose of reference by the users.

5.4 CONCLUSION

The installation of a computerised operation is undertaken because of the expected benefits of computerisation. Most organisations that are fully computerised enjoy all these benefits. Added to this is the fact that the world is in the computer age and any organisation that wants to be relevant in the future requires computer application to its day-to-day activities. It is necessary to state that an organisation does not only require to be computerised, it, in addition, demands an efficient operation of the computerised procedures. This is important so that the expected benefit of a computerised system will be fully maximised.

CHANGE PROJECT DESCRIPTION FORM

PROJECT NO (Press <ENTER> to Exit): 512 CONTRACT NO: 00013

PROJECT DESCRIPTION: ROAD CONSTRUCTION

NAME OF CONTRACTOR: JULIUS BERGER NIGERIA LIMITED

CONTRACT SUM: # 50,000,000.00 PROJECT LENGTH: 250 KM

COMMENCEMENT DATE	COMPLETION DATE	CONTRACT PERIOD
05/03/98	04/09/98	180 DAYS

SCOPE OF WORK: CONSTRUCTION OF ROAD (DUAL CARRIAGE WAY) WITH FOUR BRIDGES AT DIFFERENT POINT.

TO SAVE CHANGES (Y/N):

FIGURE IV

CANCEL PROJECT DESCRIPTION FORM

PROJECT NO (Press <ENTER> to Exit): 512 CONTRACT NO: 00013

PROJECT DESCRIPTION: ROAD CONSTRUCTION

NAME OF CONTRACTOR: JULIUS BERGER NIGERIA LIMITED

CONTRACT SUM: # 50,000,000.00 PROJECT LENGTH: 250 KM

COMMENCEMENT DATE	COMPLETION DATE	CONTRACT PERIOD
05/03/98	04/09/98	180 DAYS

SCOPE OF WORK: CONSTRUCTION OF ROAD (DUAL CARRIAGE WAY) WITH FOUR BRIDGES AT DIFFERENT POINT.

TO CANCEL DATA (Y/N):

FIGURE V

VIEW PROJECT DESCRIPTION FORM

PROJECT NO (Press <ENTER> to Exit): 512 CONTRACT NO: 00013

PROJECT DESCRIPTION: ROAD CONSTRUCTION

NAME OF CONTRACTOR: JULIUS BERGER NIGERIA LIMITED

CONTRACT SUM: # 50,000,000.00 PROJECT LENGTH: 250 KM

COMMENCEMENT DATE	COMPLETION DATE	CONTRACT PERIOD
05/03/98	04/09/98	180 DAYS

SCOPE OF WORK: CONSTRUCTION OF ROAD (DUAL CARRIAGE WAY) WITH FOUR BRIDGES AT DIFFERENT POINT.

PRESS ANY KEY TO CONTINUE

FIGURE VI

LIST OF PROJECTS

PROJECT NO.	PROJECT DESCRIPTION
123	IKOT EKPENE - CALABAR ROAD
512	ROAD CONSTRUCTION

PRESS ANY KEY TO CONTINUE

FIGURE VII

MONTHLY PROGRESS ENTRIES FORM JUNE, 1998

PROJECT 512 - ROAD CONSTRUCTION

S/NO	ITEM NO.	ITEM DESCRIPTION	QUANTITY (BOQ)
1	0001	SITE CLEARANCE	120,000
2	0002	EARTHWORKS	75,000
3	0003	GRASSING	65,000
4	0005	BOX CULVERT	11,200
5	0011	PILING	21,500
6	0007	COVER SLAB	4,500
7	0012	BASE COURSE	19,000

TO UPDATE FILE (Y/N):

FIGURE VIII

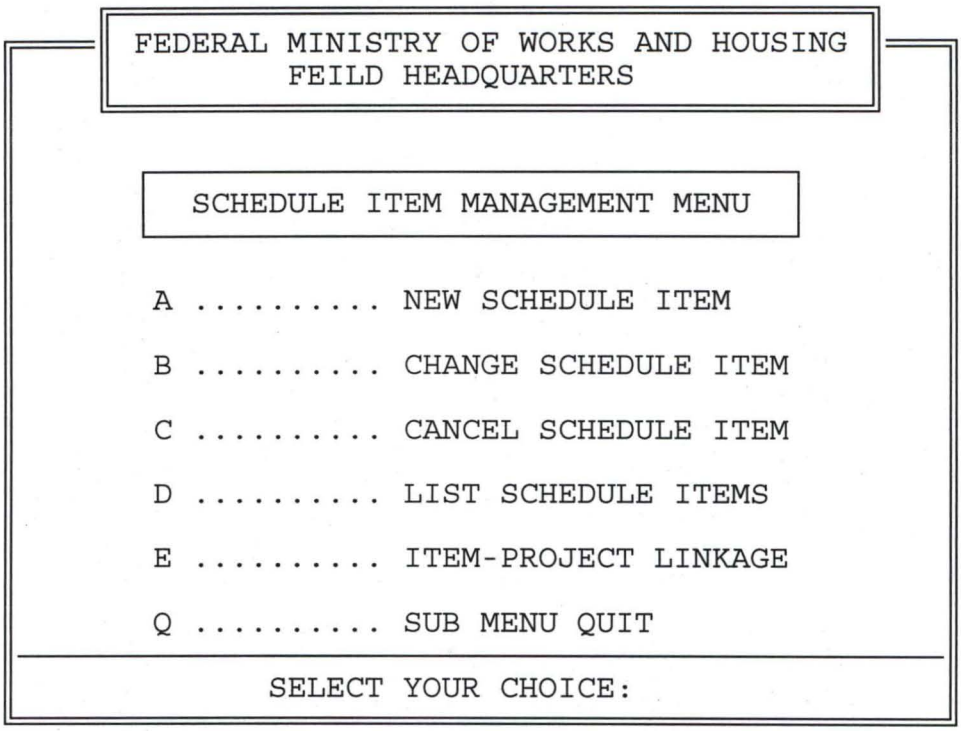

FEDERAL MINISTRY OF WORKS AND HOUSING
FEILD HEADQUARTERS
SCHEDULE ITEM MANAGEMENT MENU
A ..... NEW SCHEDULE ITEM
B ..... CHANGE SCHEDULE ITEM
C ..... CANCEL SCHEDULE ITEM
D ..... LIST SCHEDULE ITEMS
E ..... ITEM-PROJECT LINKAGE
Q ..... SUB MENU QUIT
SELECT YOUR CHOICE:

FIGURE IX

NEW SCHEDULE ITEM FORM

SCHEDULE ITEM NO (Press <ENTER> to Exit): 0016

SCHEDULE ITEM DESCRIPTION: BINDER COURSE

UNIT OF MEASUREMENT: Sq. M RATE: # 500.00

TO SAVE DATA (Y/N):

FIGURE X

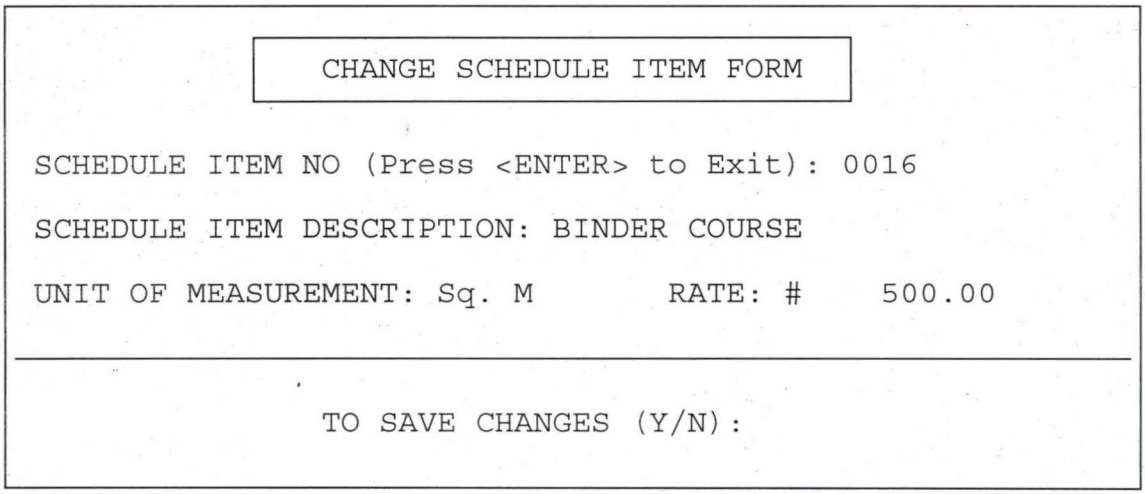

CHANGE SCHEDULE ITEM FORM
SCHEDULE ITEM NO (Press <ENTER> to Exit): 0016
SCHEDULE ITEM DESCRIPTION: BINDER COURSE
UNIT OF MEASUREMENT: Sq. M RATE: # 500.00
TO SAVE CHANGES (Y/N):

FIGURE XI

CANCEL SCHEDULE ITEM FORM

SCHEDULE ITEM NO (Press <ENTER> to Exit): 0016

SCHEDULE ITEM DESCRIPTION: BINDER COURSE

UNIT OF MEASUREMENT: Sq. M RATE: # 500.00

TO CANCEL DATA (Y/N):

FIGURE XII

DETAILS OF SCHEDULE ITEMS

ITEM NO	ITEM DESCRIPTION	UNIT	RATE
0001	SITE CLEARANCE	Ha	500.00
0002	EARTHWORKS	cu. m	200.00
0003	GRASSING	Sq. m	150.00
0004	PIPE CULVERT	lm	3,000.00
0005	BOX CULVERT	cu. m	2,500.00
0006	DRAINS	lm	1,000.00
0007	COVER SLAB	No.	5,000.00
0008	TURNOUTS	km	250.00
0009	SHAPE & COMPACT	Sq. m	500.00
0010	SUB BASE	cu. m	500.00
0011	PILING	lm	450.00
0012	BASE COURSE	cu. m	2,500.00
0013	FILTER MATERIAL	cu. m	250.00
0014	CONCRETE	cu. m	2,400.00
0015	PRIME COAT	Sq. m	300.00
0016	BINDER COURSE	Sq. M	500.00

END OF FILE - PRESS ANY KEY

FIGURE XIII

ITEM-PROJECT LINKAGE FORM

PROJECT 512 - ROAD CONSTRUCTION

S/NO	ITEM NO.	ITEM DESCRIPTION	QUANTITY (BOQ)
1	0001	SITE CLEARANCE	500,000
2	0002	EARTHWORKS	350,000
3	0003	GRASSING	185,000
4	0005	BOX CULVERT	35,000
5	0011	PILING	75,000
6	0007	COVER SLAB	34,500
7	0012	BASE COURSE	59,000

TO ENTER MORE (Y/N):

FIGURE IVX

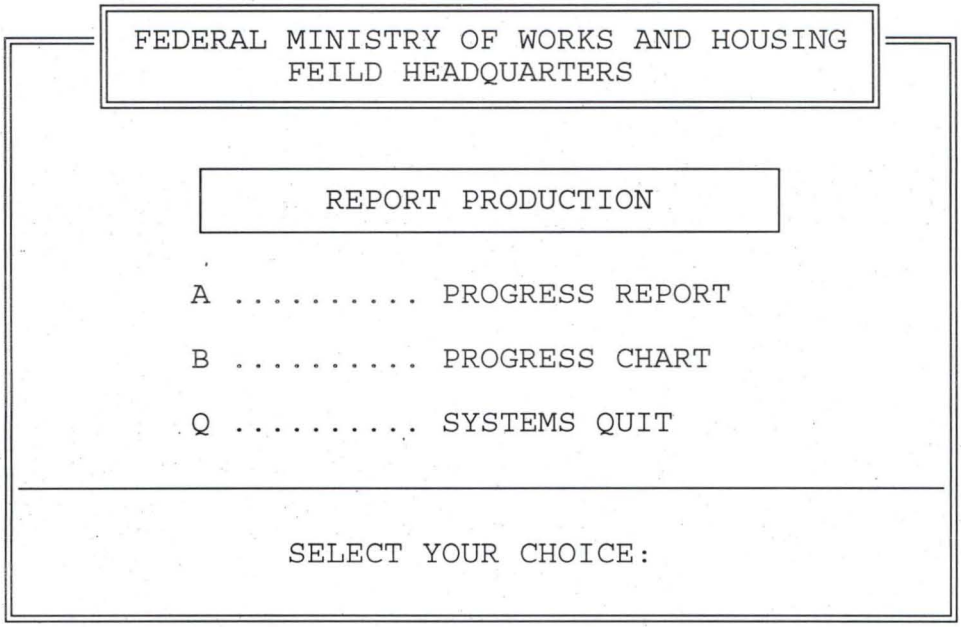

FEDERAL MINISTRY OF WORKS AND HOUSING
FEILD HEADQUARTERS
REPORT PRODUCTION
A ..... PROGRESS REPORT
B ..... PROGRESS CHART
Q ..... SYSTEMS QUIT
SELECT YOUR CHOICE:

FIGURE VX

APPENDIX II (PROGRAM DOCUMENTATION)

FMW.PRG

```
SET SCOREBOARD OFF
SET STATUS OFF
SET TALK OFF
SET DATE BRITISH
SET SAFETY OFF
DO WHILE .T.
CLEAR
 C = SPACE(1)
 @2,15 TO 24,64 DOUBLE
 @2,21 say " FEDERAL MINISTRY OF WORKS AND HOUSING "
 @3,22 SAY "       FEILD HEADQUARTERS"
 @1,20 TO 4,60 DOUBLE
 @7,36 SAY "MAIN MENU"
 @6,25 TO 8,55
 @20,16 TO 20,63
 @10,22 SAY "A ..... PROJECT DESCRIPTION"
 @12,22 SAY "B ..... MONTHLY PROGRESS ENTRIES"
 @14,22 SAY "C ..... SCHEDULE ITEM MANAGEMENT"
 @16,22 SAY "D ..... REPORT PRODUCTION"
 @18,22 SAY "Q ..... SYSTEMS QUIT"
 @22,22 SAY "      SELECT YOUR CHOICE:" GET C
 READ
 DO CASE
  CASE UPPER(C) = 'A'
   DO PROJECT
  CASE UPPER(C) = 'B'
   DO MONTHLY
```

```
   CASE UPPER(C) = 'C'
    DO ITEM
   CASE UPPER(C) = 'D'
    DO REPORT
   CASE UPPER(C) = 'Q'
    EXIT
  ENDCASE
ENDDO
CLEAR
RETURN
```

PROJECT.PRG

```
DO WHILE .T.
 C = SPACE(1)
 clea
 @1,15 TO 24,64 DOUBLE
 @1,21 say " FEDERAL MINISTRY OF WORKS AND HOUSING "
 @2,22 SAY "      FEILD HEADQUARTERS"
 @0,20 TO 3,60 DOUBLE
 @5,28 SAY "PROJECT DESCRIPTION MENU"
 @4,25 TO 6,54
 @20,16 TO 20,63
 @8,22 SAY "A ..... NEW PROJECT DESCRIPTION"
 @10,22 SAY "B ..... CHANGE PROJECT DESCRIPTION"
 @12,22 SAY "C ..... CANCEL PROJECT DESCRIPTION"
 @14,22 SAY "D ..... VIEW PROJECT DESCRIPTION"
 @16,22 SAY "E ..... LIST PROJECT DESCRIPTIONS"
 @18,22 SAY "Q ..... SUB MENU QUIT"
 @22,22 SAY "      SELECT YOUR CHOICE:" GET C
 READ
```

```
  DO CASE
    CASE UPPER(C) = 'A'
     DO NEW1
    CASE UPPER(C) = 'B'
     DO CHANGE1
    CASE UPPER(C) = 'C'
     DO CANCEL1
    CASE UPPER(C) = 'D'
     DO VIEW1
    CASE UPPER(C) = 'E'
     DO LIST1
    CASE UPPER(C) = 'Q'
     EXIT
  ENDCASE
ENDDO
RETURN
```

NEW1.PRG

```
USE PROJECT
DO WHILE .T.
  CLEAR
  @ 0,5 TO 24,74
  @ 22,6 TO 22,73
  @ 1,26 SAY 'NEW PROJECT DESCRIPTION FORM'
  @ 2,26 TO 2,53
  MPRJNO=SPACE(5)
  @ 4,7 SAY 'PROJECT NO (Press <ENTER> to Exit):' GET MPRJNO
PICTURE '@!'
  READ
  IF MPRJNO=SPACE(5)
```

```
    EXIT
  ENDIF
  GO TOP
  LOCATE FOR PRJNO=MPRJNO
  IF FOUND()
    @ 23,12 SAY 'PROJECT NO. ALREADY ENTERTED - PRESS ANY KEY TO
CONTINUE'
    SET CONSOLE OFF
    WAIT
    SET CONSOLE ON
    LOOP
  ENDIF
  MCONTNO=SPACE(5)
  STORE SPACE(50) TO MSCOPE1
  STORE SPACE(40) TO MCONTNM,MPRJDESC
  STORE 0 TO MCONTSUM,MPRJLGTH,MCONTPD
  STORE CTOD('  /  /  ') TO MDATE1,MDATE2
  STORE SPACE(65) TO MSCOPE2,MSCOPE3,MSCOPE4
  @ 4,53 SAY 'CONTRACT NO:' GET MCONTNO
  @ 6,7 SAY 'PROJECT DESCRIPTION:' GET MPRJDESC PICTURE '@!'
  @ 8,7 SAY 'NAME OF CONTRACTOR:' GET MCONTNM PICTURE '@!'
  @ 10,7 SAY 'CONTRACT SUM: #'
  @ 10,22 GET MCONTSUM PICTURE '999,999,999,999.99'
  @ 10,43 SAY 'PROJECT LENGTH:' GET MPRJLGTH PICTURE
'999,999,999'
  @ 10,71 SAY 'KM'
  @ 12,7 SAY 'COMMENCEMENT DATE'
  @ 12,33 SAY 'COMPLETION DATE'
  @ 12,57 SAY 'CONTRACT PERIOD'
  @ 13,11 GET MDATE1
  @ 13,36 GET MDATE2
```

```
 @ 13,59 GET MCONTPD PICTURE '999999'
 @ 13,66 SAY 'DAYS'
 @ 15,7 SAY 'SCOPE OF WORK:' GET MSCOPE1 PICTURE '@!'
 @ 17,7 GET MSCOPE2 PICTURE '@!'
 @ 19,7 GET MSCOPE3 PICTURE '@!'
 @ 21,7 GET MSCOPE4 PICTURE '@!'
 READ
 @ 23,29 SAY 'TO SAVE DATA (Y/N):'
 DO WHILE .T.
  RESPONSE=' '
  @ 23,50 GET RESPONSE PICTURE '!'
  READ
  IF RESPONSE='Y' .OR. RESPONSE='N'
   EXIT
  ENDIF
 ENDDO
 IF RESPONSE='Y'
  APPEND BLANK
  REPLACE PRJNO WITH MPRJNO,DATE1 WITH MDATE1
  REPLACE DATE2 WITH MDATE2,PRJDESC WITH MPRJDESC,CONTNO
WITH MCONTNO
  REPLACE CONTNM WITH MCONTNM,SCOPE1 WITH MSCOPE1,SCOPE2
WITH MSCOPE2
  REPLACE SCOPE3 WITH MSCOPE3,SCOPE4 WITH MSCOPE4,CONTSUM
WITH MCONTSUM
  REPLACE PRJLGTH WITH MPRJLGTH,CONTPD WITH MCONTPD
 ENDIF
ENDDO
USE
CLEAR
RETURN
```

CHANGE1.PRG

```
USE PROJECT
DO WHILE .T.
  CLEAR
  @ 0,5 TO 24,74
  @ 22,6 TO 22,73
  @ 1,24 SAY 'CHANGE PROJECT DESCRIPTION FORM'
  @ 2,24 TO 2,54
  MPRJNO = SPACE(5)
  @ 4,7 SAY 'PROJECT NO (Press <ENTER> to Exit):' GET MPRJNO
PICTURE '@!'
  READ
  IF MPRJNO = SPACE(5)
    EXIT
  ENDIF
  GO TOP
  LOCATE FOR PRJNO = MPRJNO
  IF .NOT. FOUND()
    @ 23,14 SAY 'PROJECT NO. NOT ENTERED - PRESS ANY KEY TO
CONTINUE'
    SET CONSOLE OFF
    WAIT
    SET CONSOLE ON
    LOOP
  ENDIF
  MCONTNO = CONTNO
  MCONTNM = CONTNM
  MPRJDESC = PRJDESC
  MCONTSUM = CONTSUM
  MPRJLGTH = PRJLGTH
```

```
MCONTPD = CONTPD
MDATE1 = DATE1
MDATE2 = DATE2
MSCOPE1 = SCOPE1
MSCOPE2 = SCOPE2
MSCOPE3 = SCOPE3
MSCOPE4 = SCOPE4
@ 4,53 SAY 'CONTRACT NO:' GET MCONTNO
@ 6,7 SAY 'PROJECT DESCRIPTION:' GET MPRJDESC PICTURE '@!'
@ 8,7 SAY 'NAME OF CONTRACTOR:' GET MCONTNM PICTURE '@!'
@ 10,7 SAY 'CONTRACT SUM: #'
@ 10,22 GET MCONTSUM PICTURE '999,999,999,999.99'
@ 10,43 SAY 'PROJECT LENGTH:' GET MPRJLGTH PICTURE
'999,999,999'
@ 10,71 SAY 'KM'
@ 12,7 SAY 'COMMENCEMENT DATE'
@ 12,33 SAY 'COMPLETION DATE'
@ 12,57 SAY 'CONTRACT PERIOD'
@ 13,11 GET MDATE1
@ 13,36 GET MDATE2
@ 13,59 GET MCONTPD PICTURE '999999'
@ 13,66 SAY 'DAYS'
@ 15,7 SAY 'SCOPE OF WORK:' GET MSCOPE1 PICTURE '@!'
@ 17,7 GET MSCOPE2 PICTURE '@!'
@ 19,7 GET MSCOPE3 PICTURE '@!'
@ 21,7 GET MSCOPE4 PICTURE '@!'
READ
@ 23,28 SAY 'TO SAVE CHANGES (Y/N):'
DO WHILE .T.
  RESPONSE = ' '
  @ 23,51 GET RESPONSE PICTURE '!'
```

```
   READ
   IF RESPONSE='Y' .OR. RESPONSE='N'
     EXIT
   ENDIF
  ENDDO
  IF RESPONSE='Y'
   REPLACE DATE2 WITH MDATE2,PRJDESC WITH MPRJDESC,CONTNO
WITH MCONTNO
   REPLACE CONTNM WITH MCONTNM,SCOPE1 WITH MSCOPE1,SCOPE2
WITH MSCOPE2
   REPLACE SCOPE3 WITH MSCOPE3,SCOPE4 WITH MSCOPE4,CONTSUM
WITH MCONTSUM
   REPLACE DATE1 WITH MDATE1,PRJLGTH WITH MPRJLGTH,CONTPD
WITH MCONTPD
  ENDIF
ENDDO
USE
CLEAR
RETURN
```

CANCEL1.PRG

```
USE PROJECT
DO WHILE .T.
  CLEAR
  @ 0,5 TO 24,74
  @ 22,6 TO 22,73
  @ 1,24 SAY 'CANCEL PROJECT DESCRIPTION FORM'
  @ 2,24 TO 2,54
  MPRJNO=SPACE(5)
  @ 4,7 SAY 'PROJECT NO (Press <ENTER> to Exit):' GET MPRJNO
```

```
PICTURE '@!'
 READ
 IF MPRJNO = SPACE(5)
  EXIT
 ENDIF
 GO TOP
 LOCATE FOR PRJNO = MPRJNO
 IF .NOT. FOUND()
  @ 23,14 SAY 'PROJECT NO. NOT ENTERED - PRESS ANY KEY TO
CONTINUE'
  SET CONSOLE OFF
  WAIT
  SET CONSOLE ON
  LOOP
 ENDIF
 MCONTNO = CONTNO
 MCONTNM = CONTNM
 MPRJDESC = PRJDESC
 MCONTSUM = CONTSUM
 MPRJLGTH = PRJLGTH
 MCONTPD = CONTPD
 MDATE1 = DATE1
 MDATE2 = DATE2
 MSCOPE1 = SCOPE1
 MSCOPE2 = SCOPE2
 MSCOPE3 = SCOPE3
 MSCOPE4 = SCOPE4
 @ 4,53 SAY 'CONTRACT NO:' GET MCONTNO
 @ 6,7 SAY 'PROJECT DESCRIPTION:' GET MPRJDESC PICTURE '@!'
 @ 8,7 SAY 'NAME OF CONTRACTOR:' GET MCONTNM PICTURE '@!'
 @ 10,7 SAY 'CONTRACT SUM: #'
```

```
  @ 10,22 GET MCONTSUM PICTURE '999,999,999,999.99'
  @ 10,43 SAY 'PROJECT LENGTH:' GET MPRJLGTH PICTURE
'999,999,999'
  @ 10,71 SAY 'KM'
  @ 12,7 SAY 'COMMENCEMENT DATE'
  @ 12,33 SAY 'COMPLETION DATE'
  @ 12,57 SAY 'CONTRACT PERIOD'
  @ 13,11 GET MDATE1
  @ 13,36 GET MDATE2
  @ 13,59 GET MCONTPD PICTURE '999999'
  @ 13,66 SAY 'DAYS'
  @ 15,7 SAY 'SCOPE OF WORK:' GET MSCOPE1 PICTURE '@!'
  @ 17,7 GET MSCOPE2 PICTURE '@!'
  @ 19,7 GET MSCOPE3 PICTURE '@!'
  @ 21,7 GET MSCOPE4 PICTURE '@!'
  CLEAR GETS
  @ 23,28 SAY 'TO CANCEL DATA (Y/N):'
  DO WHILE .T.
    RESPONSE=' '
    @ 23,51 GET RESPONSE PICTURE '!'
    READ
    IF RESPONSE='Y' .OR. RESPONSE='N'
      EXIT
    ENDIF
  ENDDO
  IF RESPONSE='Y'
    DELETE
    PACK
  ENDIF
ENDDO
USE
```

```
CLEAR
RETURN
```

VIEW1.PRG

```
USE PROJECT
DO WHILE .T.
  CLEAR
  @ 0,5 TO 24,74
  @ 22,6 TO 22,73
  @ 1,25 SAY 'VIEW PROJECT DESCRIPTION FORM'
  @ 2,25 TO 2,53
  MPRJNO = SPACE(5)
  @ 4,7 SAY 'PROJECT NO (Press <ENTER> to Exit):' GET MPRJNO
PICTURE '@!'
  READ
  IF MPRJNO = SPACE(5)
    EXIT
  ENDIF
  GO TOP
  LOCATE FOR PRJNO = MPRJNO
  IF .NOT. FOUND()
    @ 23,14 SAY 'PROJECT NO. NOT ENTERED - PRESS ANY KEY TO
CONTINUE'
    SET CONSOLE OFF
    WAIT
    SET CONSOLE ON
    LOOP
  ENDIF
  MCONTNO = CONTNO
  MCONTNM = CONTNM
```

```
MPRJDESC = PRJDESC
MCONTSUM = CONTSUM
MPRJLGTH = PRJLGTH
MCONTPD = CONTPD
MDATE1 = DATE1
MDATE2 = DATE2
MSCOPE1 = SCOPE1
MSCOPE2 = SCOPE2
MSCOPE3 = SCOPE3
MSCOPE4 = SCOPE4
@ 4,53 SAY 'CONTRACT NO:' GET MCONTNO
@ 6,7 SAY 'PROJECT DESCRIPTION:' GET MPRJDESC PICTURE '@!'
@ 8,7 SAY 'NAME OF CONTRACTOR:' GET MCONTNM PICTURE '@!'
@ 10,7 SAY 'CONTRACT SUM: #'
@ 10,22 GET MCONTSUM PICTURE '999,999,999,999.99'
@ 10,43 SAY 'PROJECT LENGTH:' GET MPRJLGTH PICTURE
'999,999,999'
@ 10,71 SAY 'KM'
@ 12,7 SAY 'COMMENCEMENT DATE'
@ 12,33 SAY 'COMPLETION DATE'
@ 12,57 SAY 'CONTRACT PERIOD'
@ 13,11 GET MDATE1
@ 13,36 GET MDATE2
@ 13,59 GET MCONTPD PICTURE '999999'
@ 13,66 SAY 'DAYS'
@ 15,7 SAY 'SCOPE OF WORK:' GET MSCOPE1 PICTURE '@!'
@ 17,7 GET MSCOPE2 PICTURE '@!'
@ 19,7 GET MSCOPE3 PICTURE '@!'
@ 21,7 GET MSCOPE4 PICTURE '@!'
@ 23,27 SAY 'PRESS ANY KEY TO CONTINUE'
SET CONSOLE OFF
```

```
  WAIT
  SET CONSOLE ON
ENDDO
USE
CLEAR
RETURN
```

LIST1.PRG

```
CLEAR
USE PROJECT
@ 1,32 say 'LIST OF PROJECTS'
@ 2,32 TO 2,47 DOUBLE
@ 3,9 TO 24,70 DOUBLE
@ 4,12 SAY 'PROJECT NO.'
@ 4,35 SAY "PROJECT DESCRIPTION"
@ 5,10 TO 5,69
@ 4,25 TO 21,25
@ 22,10 TO 22,69
R=5
DO WHILE .NOT. EOF()
  MPRJNO=PRJNO
  MPRJDESC=PRJDESC
  R=R+1
  @ R,16 SAY MPRJNO
  @ R,28 say MPRJDESC
  SKIP
ENDDO
@ 23,27 say 'PRESS ANY KEY TO CONTINUE'
SET CONSOLE OFF
WAIT
```

```
SET CONSOLE ON
USE
CLEAR
RETURN
```

MONTHLY.PRG

```
USE PROJECT
DO WHILE .T.
  CLEAR
  @ 4,8 TO 19,71
  @ 15,9 TO 15,70
  @ 6,25 SAY 'MONTHLY PROGRESS ENTRIES FORM'
  @ 7,25 TO 7,53
  MPRJNO = SPACE(5)
  @ 9,10 SAY 'PROJECT NO. (Press <ENTER> to Exit):' GET MPRJNO
PICTURE '@!'
  READ
  IF MPRJNO = SPACE(5)
    USE
    CLEAR
    RETURN
  ENDIF
  LOCATE FOR PRJNO = MPRJNO
  IF .NOT. FOUND()
    @ 17,14 SAY 'PROJECT NO. NOT ENTERED - PRESS ANY KEY TO
CONTINUE'
    SET CONSOLE OFF
    WAIT
    SET CONSOLE ON
    LOOP
```

```
 ENDIF
 MPRJDESC=PRJDESC
 @ 11,10 SAY 'PROJECT DESCRIPTION:' GET MPRJDESC PICTURE '@!'
 CLEAR GETS
 CFILE='PRJ'+RTRIM(MPRJNO)+'.DBF'
 IF FILE(CFILE)
  EXIT
 ELSE
  @ 17,10 SAY 'FILE HAS NOT BEEN CREATED - PRESS ANY KEY TO
EXIT'
  SET CONS OFF
  WAIT
  SET CONS ON
  LOOP
 ENDIF
ENDDO
CMTH='  '
CYR='    '
@ 13,10 SAY 'CURRENT PERIOD - MONTH CODE:       YEAR:'
@ 13,39 GET CMTH PICT '99'
@ 13,52 GET CYR PICT '9999'
READ
IF CMTH='01'
 MTH='JANUARY'
ENDIF
IF CMTH='02'
 MTH='FEBRUARY'
ENDIF
IF CMTH='03'
 MTH='MARCH'
ENDIF
```

```
IF CMTH='04'
  MTH='APRIL'
ENDIF
IF CMTH='05'
  MTH='MAY'
ENDIF
IF CMTH='06'
  MTH='JUNE'
ENDIF
IF CMTH='07'
  MTH='JULY'
ENDIF
IF CMTH='08'
  MTH='AUGUST'
ENDIF
IF CMTH='09'
  MTH='SEPTEMBER'
ENDIF
IF CMTH='10'
  MTH='OCTOBER'
ENDIF
IF CMTH='11'
  MTH='NOVEMBER'
ENDIF
IF CMTH='12'
  MTH='DECEMBER'
ENDIF
MTH=MTH+', '+CYR
CLEAR
TT='MONTHLY PROGRESS ENTRIES FORM '+MTH
CC=LEN(TT)
```

```
CPOS = INT((80-CC)/2)
@ 0,CPOS SAY TT
@ 1,CPOS TO 1,CPOS + CC-1
@ 2,8 TO 24,71
NUMB = 'PROJECT ' + MPRJNO
@ 3,12 GET NUMB
@ 3,26 SAY '-'
@ 3,28 GET MPRJDESC
CLEAR GETS
@ 4,9 to 4,70
@ 5,10 SAY 'S/NO'
@ 5,17 SAY 'ITEM NO.'
@ 5,30 SAY 'ITEM DESCRIPTION'
@ 5,56 SAY 'QUANTITY (BOQ)'
@ 5,15 to 21,15
@ 5,26 to 21,26
@ 5,54 to 21,54
@ 6,9 to 6,14
@ 6,16 to 6,25
@ 6,27 to 6,53
@ 6,55 to 6,70
@ 22,9 to 22,70
SNO = 0
R = 7
USE &CFILE
DO WHILE .NOT. EOF()
  SNO = SNO + 1
  MITMNO = ITMNO
  MITMDESC = ITMDESC
  MQTY = 0
  @ R,11 SAY SNO PICTURE '99'
```

```
  @ R,19 GET MITMNO
  @ R,28 GET MITMDESC
  @ R,58 GET MQTY PICTURE '99,999,999'
  CLEAR GETS
  SKIP
  R=R+2
ENDDO
GO TOP
R=7
DO WHILE .NOT. EOF()
  @ R,58 GET MQTY PICTURE '99,999,999'
  READ
  REPL CQTY WITH MQTY
  MQTY=0
  R=R+2
  SKIP
ENDDO
@ 23,28 SAY 'TO UPDATE FILE (Y/N):'
DO WHILE .T.
  RESP=' '
  @ 23,50 GET RESP PICTURE '!'
  READ
  IF RESP $ 'YN'
    EXIT
  ENDIF
ENDDO
IF RESP='Y'
  GO TOP
  DO WHIL .NOT. EOF()
    MTQTY=TQTY
    MTAMT=TAMT
```

```
    MCQTY=CQTY
    MRATE=RATE
    MCAMT=MRATE*MCQTY
    MTQTY=MTQTY+MCQTY
    MTAMT=MTAMT+MCAMT
    REPL TQTY WITH MTQTY,TAMT WITH MTAMT
    REPL CQTY WITH 0
    SKIP
  ENDDO
ENDIF
USE
CLEAR
RETURN
```

ITEM.PRG

```
DO WHILE  .T.
  C = SPACE(1)
  clea
  @2,15 TO 23,64 DOUBLE
  @2,21 say " FEDERAL MINISTRY OF WORKS AND HOUSING "
  @3,22 SAY "       FEILD HEADQUARTERS"
  @1,20 TO 4,60 DOUBLE
  @7,25 SAY "SCHEDULE ITEM MANAGEMENT MENU"
  @6,22 TO 8,56
  @21,16 TO 21,63
  @10,23 SAY "A ..... NEW SCHEDULE ITEM"
  @12,23 SAY "B ..... CHANGE SCHEDULE ITEM"
  @14,23 SAY "C ..... CANCEL SCHEDULE ITEM"
  @16,23 SAY "D ..... LIST SCHEDULE ITEMS"
  @18,23 SAY "E ..... ITEM-PROJECT LINKAGE"
```

```
 @20,23 SAY "Q ..... SUB MENU QUIT"
 @22,22 SAY "      SELECT YOUR CHOICE:" GET C PICTURE '!'
 READ
 DO CASE
   CASE UPPER(C) = 'A'
    DO NEW2
   CASE UPPER(C) = 'B'
    DO CHANGE2
   CASE UPPER(C) = 'C'
    DO CANCEL2
   CASE UPPER(C) = 'D'
    DO LIST2
   CASE UPPER(C) = 'E'
    DO LINKAGE
   CASE UPPER(C) = 'Q'
    EXIT
 ENDCASE
ENDDO
RETURN
```

NEW2.PRG

```
USE ITEM
DO WHILE .T.
 CLEAR
 @ 5,10 TO 20,69
 @ 16,11 TO 16,68
 @ 7,29 SAY 'NEW SCHEDULE ITEM FORM'
 @ 6,25 TO 8,54
 MITMNO = SPACE(4)
 @ 10,12 SAY 'SCHEDULE ITEM NO (Press <ENTER> to Exit):' GET
```

```
MITMNO PICTURE '@!'
 READ
 IF MITMNO=SPACE(4)
  EXIT
 ENDIF
 GO TOP
 LOCATE FOR ITMNO=MITMNO
 IF FOUND()
  @ 18,15 SAY 'ITEM NO. ALREADY EXIST - PRESS ANY KEY TO
CONTINUE'
  SET CONSOLE OFF
  WAIT
  SET CONSOLE ON
  LOOP
 ENDIF
 MRATE=0
 MUNIT=SPACE(5)
 MITMDESC=SPACE(25)
 @ 12,12 SAY 'SCHEDULE ITEM DESCRIPTION:' GET MITMDESC PICTURE
'@!'
 @ 14,12 SAY 'UNIT OF MEASUREMENT:' GET MUNIT
 @ 14,45 SAY 'RATE: #'
 @ 14,52 GET MRATE PICTURE '999,999.99'
 READ
 @ 18,29 SAY 'TO SAVE DATA (Y/N):'
 DO WHILE .T.
  RESPONSE=' '
  @ 18,50 GET RESPONSE PICTURE '!'
  READ
  IF RESPONSE='Y' .OR. RESPONSE='N'
   EXIT
```

```
  ENDIF
 ENDDO
 IF RESPONSE='Y'
  APPEND BLANK
  REPLACE ITMNO WITH MITMNO,ITMDESC WITH MITMDESC,UNIT WITH
MUNIT
  REPLACE RATE WITH MRATE
 ENDIF
ENDDO
USE
CLEAR
RETURN
```

CHANGE2.PRG

```
USE ITEM
DO WHILE .T.
 CLEAR
 @ 5,10 TO 20,69
 @ 16,11 TO 16,68
 @ 7,27 SAY 'CHANGE SCHEDULE ITEM FORM'
 @ 6,23 TO 8,54
 MITMNO=SPACE(4)
 @ 10,12 SAY 'SCHEDULE ITEM NO (Press <ENTER> to Exit):' GET
MITMNO PICTURE '@!'
 READ
 IF MITMNO=SPACE(4)
  EXIT
 ENDIF
 GO TOP
 LOCATE FOR ITMNO=MITMNO
```

```
 IF .NOT. FOUND()
  @ 18,15 SAY 'ITEM NO. ALREADY EXIST - PRESS ANY KEY TO
CONTINUE'
  SET CONSOLE OFF
  WAIT
  SET CONSOLE ON
  LOOP
 ENDIF
 MRATE=RATE
 MUNIT=UNIT
 MITMDESC=ITMDESC
 @ 12,12 SAY 'SCHEDULE ITEM DESCRIPTION:' GET MITMDESC PICTURE
'@!'
 @ 14,12 SAY 'UNIT OF MEASUREMENT:' GET MUNIT
 @ 14,45 SAY 'RATE: #'
 @ 14,52 GET MRATE PICTURE '999,999.99'
 READ
 @ 18,27 SAY 'TO SAVE CHANGES (Y/N):'
 DO WHILE .T.
  RESPONSE=' '
  @ 18,51 GET RESPONSE PICTURE '!'
  READ
  IF RESPONSE='Y' .OR. RESPONSE='N'
   EXIT
  ENDIF
 ENDDO
 IF RESPONSE='Y'
  REPLACE ITMDESC WITH MITMDESC,UNIT WITH MUNIT
 ENDIF
ENDDO
USE
```

```
CLEAR
RETURN
```

CANCEL2.PRG

```
USE ITEM
DO WHILE .T.
  CLEAR
  @ 5,10 TO 20,69
  @ 16,11 TO 16,68
  @ 7,27 SAY 'CANCEL SCHEDULE ITEM FORM'
  @ 6,23 TO 8,54
  MITMNO = SPACE(4)
  @ 10,12 SAY 'SCHEDULE ITEM NO (Press <ENTER> to Exit):' GET
MITMNO PICTURE '@!'
  READ
  IF MITMNO = SPACE(4)
    EXIT
  ENDIF
  GO TOP
  LOCATE FOR ITMNO = MITMNO
  IF .NOT. FOUND()
    @ 18,15 SAY 'ITEM NO. ALREADY EXIST - PRESS ANY KEY TO
CONTINUE'
    SET CONSOLE OFF
    WAIT
    SET CONSOLE ON
    LOOP
  ENDIF
  MRATE = RATE
  MUNIT = UNIT
```

```
 MITMDESC=ITMDESC
 @ 12,12 SAY 'SCHEDULE ITEM DESCRIPTION:' GET MITMDESC PICTURE
'@!'
 @ 14,12 SAY 'UNIT OF MEASUREMENT:' GET MUNIT
 @ 14,45 SAY 'RATE: #'
 @ 14,52 GET MRATE PICTURE '999,999.99'
 CLEAR GETS
 @ 18,28 SAY 'TO CANCEL DATA (Y/N):'
 DO WHILE .T.
  RESPONSE=' '
  @ 18,51 GET RESPONSE PICTURE '!'
  READ
  IF RESPONSE='Y' .OR. RESPONSE='N'
   EXIT
  ENDIF
 ENDDO
 IF RESPONSE='Y'
  DELETE
  PACK
 ENDIF
ENDDO
USE
CLEAR
RETURN
```

LIST2.PRG

```
CLEAR
USE ITEM
@ 1,27 say 'DETAILS OF SCHEDULE ITEMS'
@ 2,27 TO 2,51 DOUBLE
```

```
@ 3,6 TO 24,73 DOUBLE
@ 4,9 SAY 'ITEM NO'
@ 4,25 SAY "ITEM DESCRIPTION"
@ 4,51 SAY 'UNIT'
@ 4,64 SAY "RATE"
@ 5,7 TO 5,72
@ 4,18 TO 21,18
@ 4,48 TO 21,48
@ 4,58 TO 21,58
@ 22,10 TO 22,69
R=5
DO WHILE .NOT. EOF()
 MITMNO=ITMNO
 MITMDESC=ITMDESC
 MUNIT=UNIT
 MRATE=RATE
 R=R+1
 @ R,10 SAY MITMNO
 @ R,21 say MITMDESC
 @ R,51 SAY MUNIT
 @ R,61 say MRATE PICTURE '999,999.99'
 SKIP
 IF .NOT. EOF()
  IF R=21
   @ 23,26 SAY 'TO CONTINUE - PRESS ANY KEY'
   SET CONSOLE OFF
   WAIT
   SET CONSOLE ON
   @ 6,7 CLEAR TO 21,17
   @ 6,19 CLEAR TO 21,47
   @ 6,49 CLEAR TO 21,57
```

```
      @ 6,59 CLEAR TO 21,72
      R=5
    ENDIF
  ELSE
    @ 23,26 SAY 'END OF FILE - PRESS ANY KEY'
    SET CONSOLE OFF
    WAIT
    SET CONSOLE ON
  ENDIF
ENDDO
*@ 23,27 say 'PRESS ANY KEY TO CONTINUE'
*SET CONSOLE OFF
*WAIT
*SET CONSOLE ON
USE
CLEAR
RETURN
```

LINKAGE.PRG

```
USE PROJECT
DO WHILE .T.
  CLEAR
  @ 5,8 TO 19,71
  @ 15,9 TO 15,70
  @ 6,27 SAY 'ITEM-PROJECT LINKAGE FORM'
  @ 7,27 TO 7,51
  MPRJNO=SPACE(5)
  @ 9,10 SAY 'PROJECT NO. (Press <ENTER> to Exit):' GET MPRJNO
PICTURE '@!'
  READ
```

```
 IF MPRJNO = SPACE(5)
   USE
   CLEAR
   RETURN
 ENDIF
 LOCATE FOR PRJNO = MPRJNO
 IF .NOT. FOUND()
   @ 17,14 SAY 'PROJECT NO. NOT ENTERED - PRESS ANY KEY TO
CONTINUE'
   SET CONSOLE OFF
   WAIT
   SET CONSOLE ON
   LOOP
 ENDIF
 MPRJDESC = PRJDESC
 @ 11,10 SAY 'PROJECT DESCRIPTION:' GET MPRJDESC PICTURE '@!'
 CFILE = 'PRJ' + RTRIM(MPRJNO) + '.DBF'
 IF FILE(CFILE)
   FLAG = 'Y'
 ELSE
   FLAG = 'N'
 ENDIF
 IF FLAG = 'Y'
   @ 13,10 SAY 'NOTE - FILE HAS BEEN CREATED'
 ELSE
   @ 13,10 SAY 'NOTE - FILE HAS NOT BEEN CREATED'
 ENDIF
 CLEAR GETS
 @ 17,29 SAY 'TO CONTINUE (Y/N):'
 DO WHILE .T.
   RESPONSE = ' '
```

```
    @ 17,49 GET RESPONSE PICTURE '!'
    READ
    IF RESPONSE='Y' .OR. RESPONSE='N'
      EXIT
    ENDIF
  ENDDO
  IF RESPONSE='Y'
    EXIT
  ENDIF
ENDDO
USE GENERAL
IF .NOT. EOF()
  ZAP
ENDIF
IF FLAG='Y'
  USE GENERAL
  APPEND FROM &CFILE
ENDIF
SELECT A
  USE STATUS
SELECT B
  USE ITEM
SELECT C
  USE GENERAL
DO WHILE .T.
  CLEAR
  @ 0,27 SAY 'ITEM-PROJECT LINKAGE FORM'
  @ 1,27 TO 1,51
  @ 2,8 TO 24,71
  NUMB='PROJECT '+MPRJNO
  @ 3,12 GET NUMB
```

```
@ 3,26 SAY '-'
@ 3,28 GET MPRJDESC
CLEAR GETS
@ 4,9 to 4,70
@ 5,10 SAY 'S/NO'
@ 5,17 SAY 'ITEM NO.'
@ 5,30 SAY 'ITEM DESCRIPTION'
@ 5,56 SAY 'QUANTITY (BOQ)'
@ 5,15 to 21,15
@ 5,26 to 21,26
@ 5,54 to 21,54
@ 6,9 to 6,14
@ 6,16 to 6,25
@ 6,27 to 6,53
@ 6,55 to 6,70
@ 22,9 to 22,70
SNO=0
R=7
DO WHILE .T.
 SNO=SNO+1
 MTQTY=0
 MCAMT=0
 MCQTY=0
 @ R,11 SAY SNO PICTURE '99'
 DO WHILE .T.
  MITMNO=SPACE(4)
  @ R,19 GET MITMNO
  READ
  SELECT B
  GO TOP
  LOCATE FOR ITMNO=MITMNO
```

```
    IF .NOT. FOUND()
      @ 23,23 SAY 'ITEM NO NOT EXIST - PRESS ANY KEY'
      SET CONSOLE OFF
      WAIT
      SET CONSOLE ON
      @ 23,23 SAY SPACE(34)
      LOOP
    ENDIF
    MITMDESC=ITMDESC
    MRATE=RATE
    MUNIT=UNIT
    @ R,28 GET MITMDESC
    CLEAR GETS
    SELECT C
    GO TOP
    LOCATE FOR ITMNO=MITMNO
    IF FOUND()
      MTQTY=TQTY
    ENDIF
    EXIT
  ENDDO
  @ R,58 GET MTQTY PICTURE '99,999,999'
  READ
  MTAMT=MTQTY*MRATE
  USE GENERAL
  APPEND BLANK
  REPLACE ITMNO WITH MITMNO,ITMDESC WITH MITMDESC,RATE WITH
MRATE
  REPLACE TQTY WITH MTQTY,TAMT WITH MTAMT,CQTY WITH MCQTY
  REPLACE CAMT WITH MCAMT,UNIT WITH MUNIT
  @ 23,29 SAY 'TO ENTER MORE (Y/N):'
```

```
  DO WHILE .T.
   RESP=' '
   @ 23,50 GET RESP PICTURE '!'
   READ
   IF RESP $ 'YN'
    EXIT
   ENDIF
  ENDDO
  @ 23,29 CLEAR TO 23,50
  IF RESP='N'
   EXIT
  ENDIF
  R=R+2
  IF R>21
   @ 7,2 CLEAR TO 21,7
   @ 7,9 CLEAR TO 21,19
   @ 7,21 CLEAR TO 21,52
   @ 7,54 CLEAR TO 21,63
   @ 7,65 CLEAR TO 21,77
   R=7
  ENDIF
ENDDO
CLOSE ALL
USE GENERAL
IF RESP='N'
  @ 23,28 SAY 'TO UPDATE FILE (Y/N):'
  DO WHILE .T.
   RESP=' '
   @ 23,50 GET RESP PICTURE '!'
   READ
   IF RESP $ 'YN'
```

```
      EXIT
     ENDIF
    ENDDO
  ENDIF
  IF RESP='Y'
    COPY STRU TO &CFILE
    USE &CFILE
    IF FLAG='Y'
     ZAP
    ENDIF
    APPEND FROM GENERAL
  ENDIF
  USE GENERAL
  ZAP
  EXIT
ENDDO
CLOSE ALL
CLEAR
RETURN
```

REPORT.PRG

```
DO WHILE .T.
  CLEAR
  C = SPACE(1)
  @4,15 TO 22,64 DOUBLE
  @4,21 say " FEDERAL MINISTRY OF WORKS AND HOUSING "
  @5,22 SAY "       FEILD HEADQUARTERS"
  @3,20 TO 6,60 DOUBLE
  @9,32 SAY "REPORT PRODUCTION"
  @8,25 TO 10,55
```

```
 @18,16 TO 18,63
 @12,25 SAY "A ..... PROGRESS REPORT"
 @14,25 SAY "B ..... PROGRESS CHART"
 @16,25 SAY "Q ..... SYSTEMS QUIT"
 @20,23 SAY "      SELECT YOUR CHOICE:" GET C
 READ
 DO CASE
  CASE UPPER(C) = 'A'
   DO PREP
  CASE UPPER(C) = 'B'
   DO PCHT
  CASE UPPER(C) = 'Q'
   EXIT
 ENDCASE
ENDDO
CLEAR
RETURN
```