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TRANSPORTATION OF HAZARDOUS MATERIALS IN ARIZONA

Volume II: Hazardous Materials Data Base Management System: Development and Programs

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The objective of the study was to assess the magnitude of hazardous materials shipments, load characteristics in terms of chemical type, volume and hazard class. These data were allocated to routes in Arizona. The analyses is a first step in understanding the hazardous materials transportation situation and will serve as a basis for risk assessment studies. A data base management system was developed for data manipulation and retrieval by state agencies for program planning, risk evaluations and as a basis for risk evaluations. Several surveys were conducted to obtain the data. These included: 1) hazardous waste shipments for 1983 and 1984 compiled from RCRA manifests; 2) two one-week surveys of placarded trucks at Arizona's major ports of entry; 3) an intra-state survey at 9 state locations; 4) interviews with distributors of gasoline, acids and propane.

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INTRODUCTION

Information related to hazardous materials and hazardous wastes were collected from two different sources. The hazardous wastes information was obtained from the manifestation system provided by Arizona Department of Health Services (ADHS). The data were collected for the years 1984 and 1983, and the total number of manifests collected amounted to a little over 5000 records. The hazardous material data were secured by the two ports-of-entry surveys conducted by the Motor Vehicle Division (MVD). Each survey resulted in a little over 3000 records, and each record contains information related to chemical type, hazardous class, amount, destination, and other relevant information.

It was imperative that this large amount of data be computerized in a fashion to permit manipulation by any selected attribute such as: date, destination city, transportation route, hazard class, or a combination of the above. This document describes the steps undertaken to develop the Data Base Management Systems (DBMS) for the transportation of hazardous materials and hazardous wastes in Arizona. It includes the selection of computer hardware and software, the design of the data base input and output form, the development of the necessary command procedures to produce statistical relationships, the step-by-step procedure to access and operate the DBMS, and, finally, the listing of command procedures.

COMPUTER SYSTEM

Hardware Selection

The first decision was to choose between main-frame computers and microcomputers. Main-frame computers are known for their superiority over microcomputers in terms of speed and memory capabilities. Most state agencies have access to main-frame computers of one type or another. Although main-frame computers have speed superiority, they have some disadvantages including high initial cost, relatively high maintenance cost, user's training needs, and data system incompatability.

Microcomputers are inexpensive reliable, easy to master and need less office space. The advancement in the microcomputer technology is diminishing the gap between them and main-frame computers as far as memory and speed is concerned. Numerous state agencies are purchasing microcomputers and they are actively training their employees to use them efficiently.

Considering these factors, it was decided that the study utilize microcomputers in developing the information management system. They have been proven to perform well, and are suitable for business and engineering applications. Furthermore, IBM is being used by the Information System Group at ADOT. For these reasons it was decided that IBM microcomputers be adopted for this project.

Software Selection

Data storage and retrieval is one organizational activity that benefits from microcomputer use. Electronic recordkeeping systems managed with microcomputers are superior to manual systems because of

the speed with which individual records can be stored or located in files. A record is the basic component of a file. It contains all the pertinent information about a specific case within a file. For example, in a hazardous waste file, each record would contain information extracted from the manifest such as the generator's name, the transporter name, the chemical name, the shipment quantity, along with any other information of interest about that manifest.

Data base managers are good for managing large amounts of information (up to 100,000 records on fast microcomputers) that might be stored in several related files. Some examples of data base management software include dBASE II, dBASE III, R:base 4000, and DATAEASE.

Graphic presentation of data is a most effective mode of presentation. Microcomputers can produce good quality business graphics such as pie charts, bar charts, x-y plots, and other types of displays. Given the appropriate software and hardware, the computer can generate graphics on the screen, on dot matrix printers, and on pen plotters. Data base managers do not have graphics capability, however integrated software may contain graphic modules. A typical integrated software generally offers word processing, data management, spread sheet, and graphics capabilities in one integrated program. Lotus symphony, Lotus 123, Framework, and Enable are examples of integrated packages. The data management module in all the integrated software is limited in its capability and speed in manipulating large size data. The use of such software in this research project is clearly an inefficient way of creating a data base management system for hazardous material transportation.

The next logical step was to select a data base manager. The four popular commercial software, namely dBASE II, dBASE III, R:base 4000 and DATAEASE, were evaluated in terms of: 1) capability 2) speed 3) friendliness and 4) memory usage. dBASE II and R:base 4000 were eliminated at the initial stage because they did not meet the four criteria listed above.

The comparative assessment of software was discussed with officials from the Information System Group at ADOT, and it was strongly recommended to the research team to use dBASE III since it is supported by ADOT personnel. It was therefore decided to adopt dBASE III for this project.

Hazardous Waste Data Base

The ADHS made available the original hazardous waste manifests. Data was collected for the years 1983 and 1984, and a total of 5078 manifests were recorded.

To manipulate the waste data by time period, chemical identification, hazard class, and transportation routes, it was found necessary to create three files. The first file is the manifest file (abbreviated "mani") that contained information related to shipment date, generator E.P.A. I.D., Transporter E.P.A.I.D., Transporter/storage/disposal (T/S/D) E.P.A I.D., chemical U.N. number, hazard class, transportation route and quantity of wastes. Figure 1 shows the structure for mani, and the width of individual fields. Up to four chemicals were listed per record and up to two routes were permitted. Field T1 and T2 are used for data maintenance (sorting and other activities). Figure 2 displays a selected record of the mani file.

The second file (called "cpid") contained information related to the generators, T/S/D, and transporters. Detailed information, such as E.P.A. I.D., address, phone number and type (attribute) are documented in individual records.

FIGURE 1
Structure of "mani" Records

Field	Field Name	Type	Width
1	Mani No	Character	8
2	Mani Tag	Character	1
3	Ship Date	Date	8
4	Gen ID	Character	12
5	Tran1 ID	Character	12
6	Tran2 ID	Character	12
7	TSD ID	Character	12
8	CHName1	Character	4
9	Class1	Character	5
10	Quant1 lb	Numeric	8
11	Vol1 Gal	Numeric	8
12	CHName2	Character	4
13	Class2	Character	5
14	Quant2 lb	Numeric	8
15	Vol2 Gal	Numeric	8
16	CHName3	Character	4
17	Class3	Character	5
18	Quant3 lb	Numeric	8
19	Vol3 gal	Numeric	8
20	CHName4	Character	4
21	Class4	Character	5
22	Quant4 lb	Numeric	8
23	Vol4 Gal	Numeric	8
24	Route1	Character	5
25	Route2	Character	5
26	T1	Character	1
27	T2	Character	1
TOTAL			178

****MANIFEST OF WASTE MATERIAL****

MANIFEST No. 84055
SHIP DATE 06/18/34

GENERATOR EPA id AZD054408794

TRANSPORTOR EPA id CAD008302903 OTHER TRANSPORTOR

T/S/D EPA id CAD008302903

	NAME	LB	GAL	CLASS
CHEMICAL	1593	0	676	ORM-A
	2831	0	1140	ORM-A
	9189	0	1300	ORM-E

Figure 2. A Sample of a Manifest Record

The structure of the "cpid" file is shown in Figure 3 and a sample of selected T/S/D facility data is displayed in Figure 4.

The third file contained the transportation routes that connect generators and T/S/D facilities as reported in the manifests. As Figure 5 shows, each record contained the origin city, the destination city (CITY 2), route code, and up to 15 links per route. Figure 6 displays a sample of a record extracted from the "tra" file.

Counts of records contained in the second and the third files revealed that for the transportation of hazardous wastes, there exist a total of 228 companies (generators, T/S/D, etc.), eighty-two (82) transportation routes, and fifty-two (52) links.

FIGURE 3
Structure of "Cpid" Records

Field	Field Name	Type	Width
1	ID	Character	12
2	Name	Character	30
3	City	Character	15
4	Address	Character	50
5	Phone	Character	11
6	Attribute	Character	3
7	Tag	Character	1
8	Tag 2	Character	1
TOTAL			124

FIGURE 4
A Sample of "cpid" records

Record No.	6
ID	ARD069748192
Name	Ensco
City	El Dorado
Address	47th Smith Road El Dorado AR 71730
Phone	501-8637173
Attribute	TSD
Tag	
Tag2	

FIGURE 5
Structure of "tra" Records

Field	Field Name	Type	Width
1	CITY	Character	15
2	CITY2	Character	15
3	ROUTE	Character	4
4	SEC1	Character	3
5	SEC2	Character	3
6	SEC3	Character	3
7	SEC4	Character	3
8	SEC5	Character	3
9	SEC6	Character	3
10	SEC7	Character	3
11	SEC8	Character	3
12	SEC9	Character	3
13	SEC10	Character	3
14	SEC11	Character	3
15	SEC12	Character	3
16	SEC13	Character	3
17	SEC14	Character	3
18	SEC15	Character	3
19	T1	Character	1
20	T2	Character	1
TOTAL			82

FIGURE 6
A Sample of "tra" Records

Record No.	38
CITY	PHOENIX
CITY2	SAN SIMON
ROUTE	FS1
SEC1	1
SEC2	2
SEC3	3
SEC4	4
SEC5	5
SEC6	6
SEC7	17
SEC8	18
SEC9	19
SEC10	20
SEC11	
SEC12	
SEC13	
SEC14	
SEC15	
T1	
T2	

Hazardous Material Data Base

Data collected from the port of entry surveys were coded and stored in two files. The first file, called "haz," contained information related to:

1) Survey Date and time of day

2) Port name

3) Consignee name and address

4) Chemical number and hazard class and subclass

5) Chemical amount

6) Transportation route

The structure of the "haz" file is displayed in Figure 7. In regard to the transportation routes, a file similar to "tra" was created and contained all possible routes from the five ports of entry to all possible consignees. The first survey data amounted to 3045 records, 316 transportation routes, and 30 links. It is important to point out that each record contains only one chemical. A sample of a hazardous material record is shown in Figure 8.

FIGURE 7
Structure of "haz" Records

Field	Field Name	Type	Width
1	NOO	Character	6
2	NO	Character	5
3	TAG	Character	1
4	DATE	Date	8
5	TIME	Character	3
6	PORT	Character	15
7	CONSIGNEE	Character	20
8	CITY	Character	15
9	STATE	Character	5
10	CHEM NUM	Character	4
11	CLASS	Character	5
12	STATUS	Character	1
13	SUBCLASS	Character	1
14	LBS	Numeric	8
15	GALS	Numeric	8
16	ROUTE1	Character	4
17	T1	Character	1
18	T2	Character	1
TOTAL			112

****HAZARDOUS MATERIALS ENTERING ARIZONA****

No. 11

DATE 07/19/85 TIME mid

PORT ehrenberg

CONSIGNEE sky harbor

CITY phoenix STATE az

	No.	LB	GAL	CLASS		
CHEMICAL	1203	0	8860	flam	STATUS 1	SUBCLASS

Figure 8. A Sample of a Hazardous Material Record

Command Procedures

A command procedure called "MAIN" was developed to diagnose the data, develop statistical reports, and permit the user to select between hazardous material data and hazardous waste data. A group of sub-command procedures were developed in coordination with MAIN to perform the three functions mentioned earlier. MAIN is menu driven and it permits the user to access information interactively. The flow diagram of the command procedure and the sub-command procedures is shown in Figure 9. A set of command proceudres within MAIN was developed, such as AUX0, AUX1, etc., and a listing of all these procedures is provided in the Appendix. The command procedure and the sub-command procedures are written in the dBASE III special language which is very similar to the PASCAL language.

The program permits the user to perform three functions. The first function is used to develop a statistical report by time period, chemical number, and hazard class. The second function provides the capability of screen editing of individual records and enables the user to correct faulty records. The third function is used to select the appropriate data base (waste versus hazardous materials).

The statistical report produced from the first function follows the following criterion:

1. By time period:
    a) By year (1984, 1983)
    b) By month (January, February, etc.)
    c) By day (4/13/1984)
    d) By weekday (Sunday, Monday, etc.)

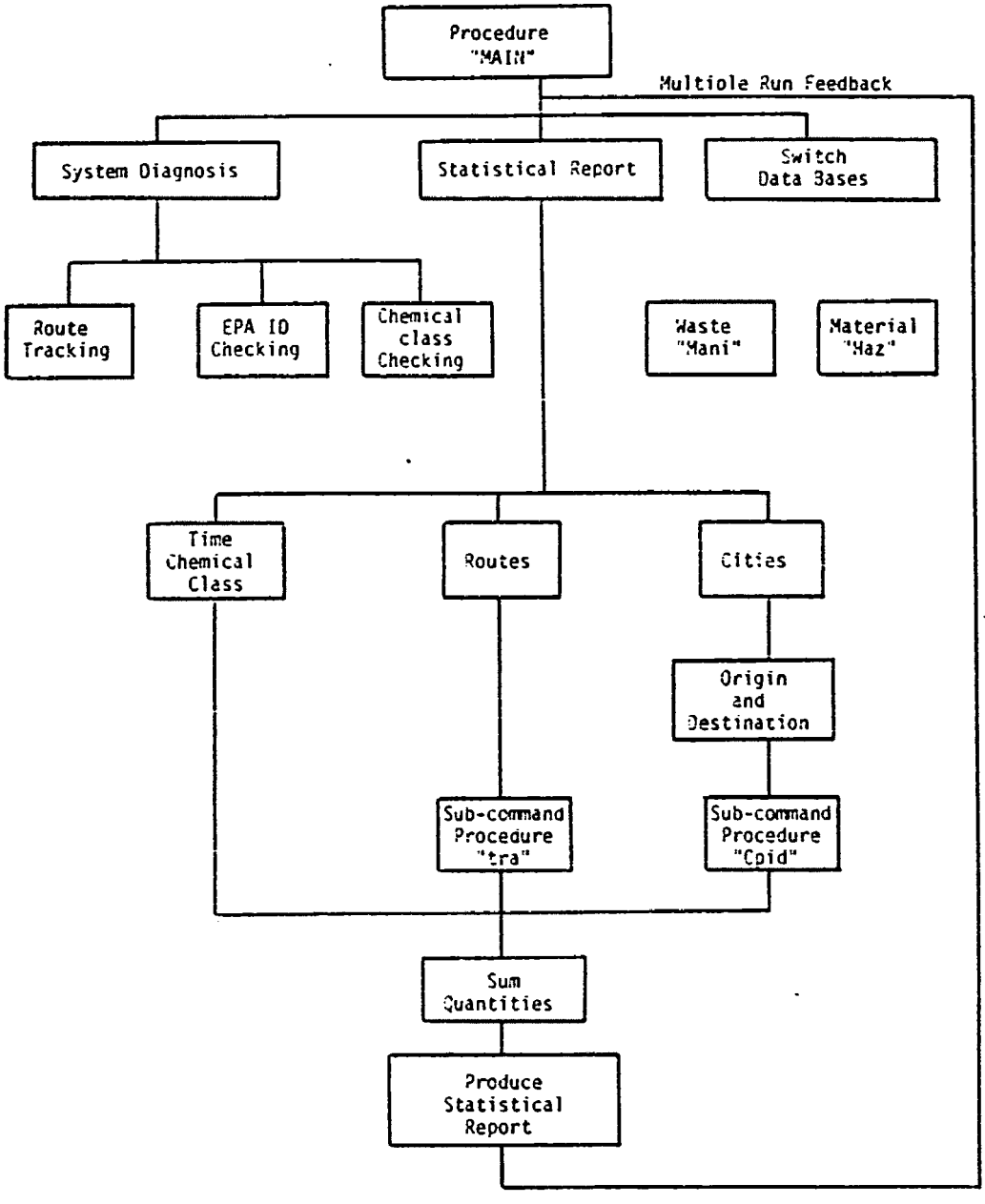

FIGURE 9. Flow Diagram of the Original DBMS.

2. By chemical origin city
3. By destination city
4. By chemical number (9289, 1760, etc.)
5. By company (E.P.A. I.D number)
6. By chemical class (explosive, corrosive, etc.)
7. By transportation route (IF 1, FE 3, etc.)

The user may use the AND and OR options with the above listed criteria. The AND provides a cross tabulation of two or more criteria.

MODIFIED DBMS

The major concern of designing the database was portability and ease to maintain. As we developed the system, we discovered that speed became a major obstacle. The hazardous waste file for example contains close to 5,000 records. A single query takes 30 minutes and a batch job may run over 10 hours, a time frame the user may not feel comfortable with. To reduce the execution time, two strategies were attempted. The first strategy was to combine a large number of variables into one record and consequently reduce the number of iterations executed by MAIN. This is clearly a trade-off between requiring a larger storage area and reducing the run time. The second strategy was to split the data base into smaller files and thus reducing the computer run time even further. The following section describes the modified DBMS to execute the first strategy.

The concept behind the modified DBMS is to produce a record that contains information related to:

1) Generator E.P.A.I.D., name, and city
2) Transporter E.P.A.I.D., name, and city
3) T/S/D E.P.A.I.D., name, and city
4) Chemical number and class
5) The route between the origin and the destination
6) The links numbers for this route.

A new file called "Clmn" was added to the system to provide a relationship between any given chemical number (1203 for example) and its corresponding class (Flammable). The number of records contained in this file corresponds to the number of chemicals compiled from the two

port-of-entry surveys, and the size of this file amounted to 92 records. This file is accessed only when the user selects the hazardous material data base option.

The structure of the modified DBMS is shown in Figure 10. As the diagram shows, the two maintenance activities, data base diagnosis and reindex of data base, necessitate the interaction with the three basic files (cpid, tra, and clmn). Once these files are successfully updated, they are then incorporated in the main files (MANI for hazardous waste and HAZ for hazardous materials) for the purpose of generating statistics.

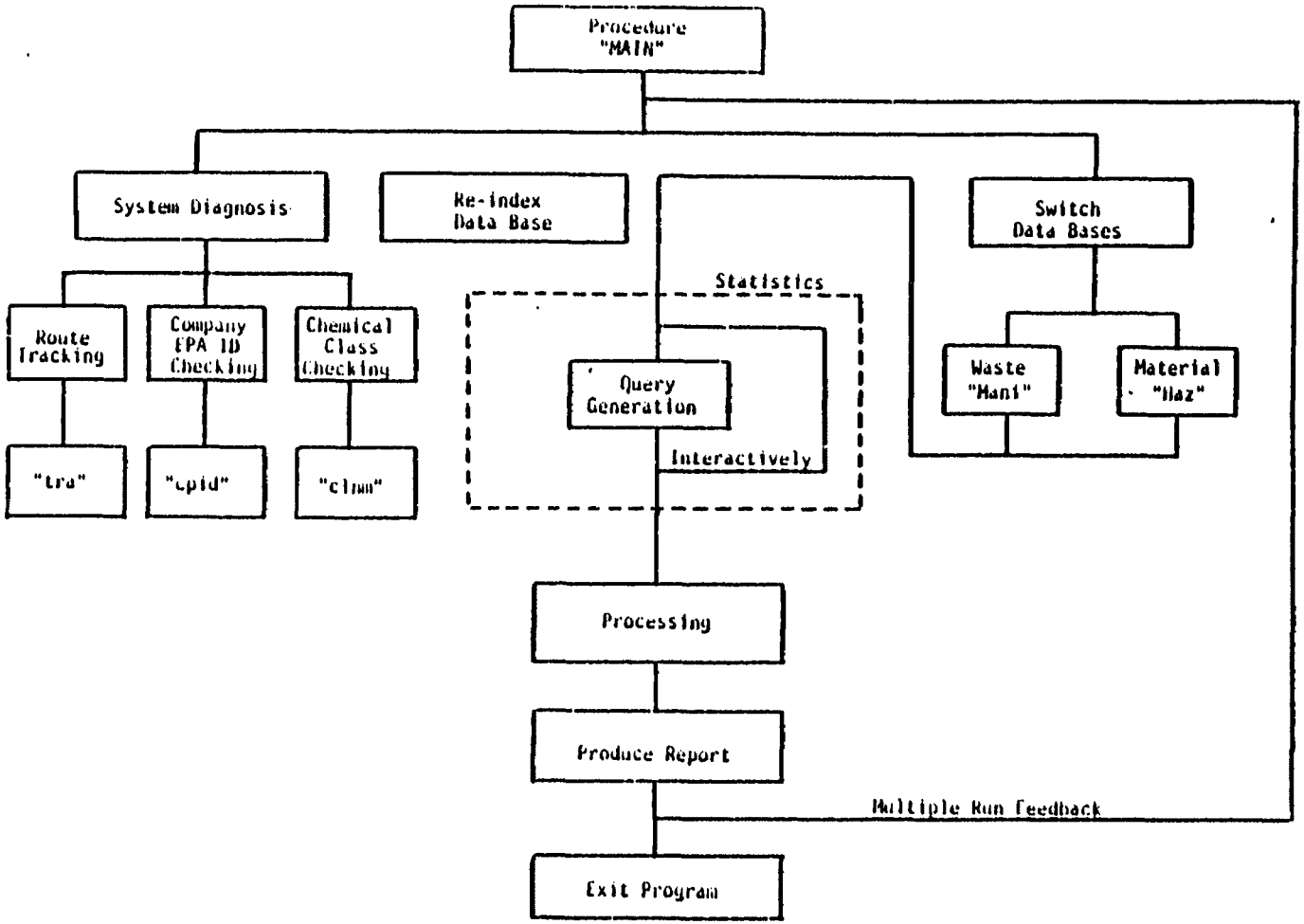

FIGURE 10. Flow Diagram of the Modified DBMS.

DBMS MAINTENANCE

Naming of Database

The program can identify database type only by the name of database. All database with the structure of MANI should be named with initial character of 'M' and all database with structure of HAZ should initiate with 'H'.

About the Program "MAIN"

It is a database utility program which includes statistical reports database diagnosis designed to let the user do it interactively without knowing the internal structure of database.

The program generates statistical reports by allowing the user to multiselect criteria as many as the string buffer can hold. Program executing may be time consuming if database is too big. It is recommended that the user split the database into small ones if they are not used concurrently. Experience has told us that a database with a record size of 1000 records is an acceptable limit. A good way to separate them is to split them by shipping year or half year. It is advisable to keep the original database (the big file) for it is the main source.

Database diagnosis is for data checking. Human errors are inevitable, hence after entering new data into the database a diagnosis is recommended to check EPA id, chemical class, also internal data will be reset for further usage.

Appropriate Maintenance

To keep the database up to date, several activities should be done periodically:

A. Do a diagnosis after new data are added. (Any new data should be added to one single pool and then update our small database by re-splitting it).

B. Update CPID (company information), TRA (route data), and CLNM (chemical class).

The Use of "MAIN"

"MAIN" is a database utility program and is easy to use because it is written in menu driven format. Since we are handling database with large amounts of data, time is a critical issue. The use of program prompting definitely saves time for small number of criteria. For generating routine reports that contain large number of criteria and statistics, we suggest the use of a batch file written in normal dBASE III command procedure.

STEP-BY-STEP GUIDE FOR "MAIN"

1. Where are the Needed Files?

Power on your PC, set default directory to where databases and programs exist. (Suppose they are on C disk).

```
C>dir *.dbf
```

(You will have a database list like:

. . . . .

MANI.DBF . . .

HAZ. DBF . . .

. . . . .

C>dir *.exe

. . . . .

MAIN.EXE . . . (This is the database utility file)

. . . . .

C>dir *.ntx

. . . . .

INDCP.NTX . . . (This is the index file we are using,

it is different from normal dBASE III indes file).

C>ndx

. . . reindexing database

2. How to Split a Database

We suggest that you split your database into small database so that you can speed up processing database.

To split a database:

C>dbase (get into database first)

. . . (now in dBASE III).

.Use MANI (Access your main database whatever you name it).

.Copy to m[xxx] for [the criteria to split your database]

Where:

m[xxx] is the name of database to be copy to

for example:

.copy to mani84 for year (ship-date) = 1984.....

.....(create a data base called MANI 84)

or

.copy to mani84-1 for dtoc (ship-date) > = '01/01/84' .and.;

.dtoc (ship-date) < '07/01/84'.

. . . . (split it by half a year for 1984)

To split HAZ database:

.use haz (or whatever the name is).

.copy to haz84 for year(date) = 1984

. . . .

3. Using MAIN

Before using MAIN, it is better that databases and the program are in the same directory.

C>MAIN (Type MAIN in DOS mode)

. . . . (loading program)

. . . .

. . . . (Program heading, read it if you like).

. . .

Do you need printer? (Respond with 'Y' if you really need hardcopies).

. . .

. . . listing of database available

. . .

Choose your database ->MANI (CHOOSE YOUR DATABASE BY KEY IN ____
the name).

. . .

1> Statistic report

2> Database diagnosis

3> Switch database

4> Exit

-> 3 (This allows you to switch from one database to another).

. . . (Choose your database again).

Now we try some statistic attributes.

Query: Statistic report on database MANI for those records shipped on Sunday for the month of May.

C>MAIN (Enter MAIN program).

. . . loading

. . .

(A list of database available)

. . .

Choose your database ->MANI

. . .

1> Statistic report

2> Database diagnosis

3> Switch database

4> Exit

-> 1

. . .

1> By time period

2> By chemical original city

3> . . .

. . .

Select criteria to be used -> 1

. . .

Select time unit

1> By year

2> By month

3> By day

4> By week day

=> 4

. . . (Select week day option).

Enter specified weekday (1[Sun] 2[Mon] . . .)

=> 1

. . . (select Sunday)

. . .

Any other criteria to be used?

=> Y

(Again program prompt for another criteria list this time choose

1> By time period

. . .

and 2> by month (Respond with may for choosing 'may').

Is this an AND condition or OR condition?

=> a (or hit a return to be default [and]).

(Respond with No for no other criteria to be used).

(Program calculates result and prints out on screen).

4. A Sample Run of the DBMS

A sample run of a selected statistical report is shown in Figure 11.

```
                                                MAIN DATABASE : mal

******** Main Menu ********

    1> Statistical Report

    2> Database Diagnosis

    3> Switch Database

    4> Re-index Database

    5> Exit

Is route-links related query involved ?
(Say no for fast execution)          N


                    1> By Time Period

                    2> By Chemical Original City

                    3> By Destination City

                    4> By Chemical Number

                    5> By Company

                    6> By Chemical Class

                    7> By Shipment Route

    Select criteria to be used ->        1
```

Figure 11. A Sample Run of the DBMS

```
                                        MAIN DATABASE : mal
                                                Select time unit
                                                1> By year
                                                2> By month
                                                3> By day
                                                4> By week day
                                             => 4

    1> By Time Period

    2> By Chemical Original City

    3> By Destination City

    4> By Chemical Number

    5> By Company

    6> By Chemical Class

    7> By Shipment Route


                                        MAIN DATABASE : mal
Specify Week day (  1(Sun),2(Mon),...7)
=> 1


    1> By Time Period

    2> By Chemical Original City

    3> By Destination City

    4> By Chemical Number

    5> By Company

    6> By Chemical Class

    7> By Shipment Route
```

Figure 11. (cont.)

```
                                                    MAIN DATABASE : mal
-- Current Criteria --
 dow(SHIP_DATE) = 1 (Sunday)

    1> By Time Period

    2> By Chemical Original City

    3> By Destination City

    4> By Chemical Number

    5> By Company

    6> By Chemical Class

    7> By Shipment Route

Any other criteria to be used ( Y/N )?
( Statistic criteria can be multichoosed )
=> N
```

Figure 11. (cont.)

```
                                                    MAIN DATABASE : mal

-- Selected Criteria --
 dow(SHIP_DATE) = 1 (Sunday)



Total weight                          233240 lbs
Total volume                          128010 gals
Number of records processed               60
Number of shipments                       60


< Type any key to return to the main menu >
```

Figure 11. (cont.)

APPENDIX

MAIN PROGRAM

```
SET TALK OFF
set  color  to bg+/
clear
TEXT
     ************************************************

     *  YOU ARE ENTERING DATABASE MAIN UTILITY PROGRAM *

     ************************************************

     9.1985  By Shieh


  Through main menu you can access database application programs
  that can help you doing statistic report,  database  diagnosis,
etc.
  Some other softwares are under development now.  We also expect
  customerized  software  request from users.   If you have ques-
tions
  using these programs or you want any aspect to be added on,
  Contact Dr. Radwan, Civil Engr. ASU. (602) 965-2885


  Some parts of this program may take longer time ,
  hence follow program prompting will save your time.

ENDTEXT

set color to g+/ ,b+/w
PUBLIC CT,ct2,ct3,ct4,flag0,FLAG1,FLAG2,flag3,con,lim
* FLAG0 - 4,6
* FLAG1 - SECS
* FLAG2 - AND OR
* flag3 - database
* database
* 1 - main
* 2 - cpid
* 3 - tra
* 4 - clnm
WAIT '  Do you need orinter ? ' TO Y
IF UPPER(Y) = 'Y'
  SET PRINT ON
 ELSE
  SET PRINT OFF
ENDIF
```

```
  lim = 0
 DO AUX10
DO WHILE .T.
@ 1,0 CLEAR

  ct = ' '
  CT2 = ' '
  CT3 = ' '
  CT4 = ' '
  flag0 = ' '
  FLAG1 = '0'
  FLAG2 = ' '
  con = 'o'

  do clean
  set color to g+/
  @  3,5  say '******** Main Menu ********'
  @  6,5  say '    1> Statistic Report      '
  @  9,5  SAY '    2> Database Diagnosis    '
  @ 12,5  say '    3> Switch Database       '
  @ 15,5  say '    4> Re-index Database     '
  @ 18,5  SAY '    5> Exit                  '
  @ 20,0
  set color to w/g+
  wait ' Select your choice -> ' to costing
**************************
  DO CASE
      CASE Costing = '1'



 set color to g+/
   @ 20,0 clear

   @20,0 say ' Is route-links related query involved ? '
    wait ' (Say no for fast execution)' to ye
   if upper(ye) = 'Y'
   @ 1,0 clear
   @ 1,0 say 'Please Wait! '
   repl all t1 with ' '
   repl all t2 with ' '
   endif
   @ 1,0 clear

   store ' '   to cnt
   store 'y' to ans

   do while ans = 'y' .or. ans = 'Y'
```

```
      set color to b+/
      @ 7,15 say    ' 1> By Time Period                    '
      @ 8,15 say    '                                      '
      @ 9,15 say    ' 2> By Chemical Original City         '
      @ 10,15 say   '                                      '
      @ 11,15 say   ' 3> By Destination City               '
      @ 12,15 say   '                                      '
      @ 13,15 say   ' 4> By Chemical Number                '
      @ 14,15 say   '                                      '
      @ 15,15 say   ' 5> By Company                        '
      @ 16,15 say   '                                      '
      @ 17,15 say   ' 6> By Chemical Class                 '
      @ 18,15 say   '                                      '
      @ 19,15 say   ' 7> By Shipment Route                 '
      @ 24,0
      @ 23,0
      @ 22,0
      @ 21,0
      @ 20,0
      set color to g+/
      wait  '       Select criteria to be used -> ' to cnt
      @ 21,0
      @ 20,0
    if con <> 'o'
       do clean
       set color to w/g+
       @ 21,0 say ' Is this going  to  be  AND  or  OR  condition
(default AND)'
       wait ' => ' to FLAG2
       flag2 = upper(flag2)
       set color to g+/ ,b/w
       do clean
    endif

  do case
     case cnt = '1'
       @ 7,48 say '*'
     case cnt = '2'
       @ 9,48 say '*'
     case cnt = '3'
       @ 11,48 say '*'
     case cnt = '4'
       @ 13,48 say '*'
     case cnt = '5'
       @ 15,48 say '*'
     case cnt = '6'
       @ 17,48 say '*'
     case cnt = '7'
```

```
      @ 19,48 say '*'
  endcase

   IF CNT = '2' .OR. CNT = '3'
 if flag3 = 1 .
   DO aux1 WITH cnt,CON
else
  do aux4 with cnt,con
 endif
   ELSE
     do aux0 with cnt,con
   ENDIF
     do clean
  set color to w/g+
  @ 5,0
  @ 4,0
  @ 3,0
  @ 2,0
  @ 1,0
  @ 1,0 say '-- Current Criteria --'
    ? ' '
    ?? CT
     set color to g+/
     @ 20,0
     set color to w/g+
     ? ' Any other criteria to be used ( Y/N ) ?  '
     ? ' ( Statistic criteria can be multichoosed )'
     wait ' => ' to ans
     set color to g+/ ,b/w
     do clean
     con = 'x'
     enddo
     do aux3


****************************

      case costing = '2'
   set color to g+/
   do Diag

*************************

      case costing = '3'
      set color to g+/
       do aux10
```

```
**************************

      case costing = '4'
      set color to g+/
      @ 20,0 clear
      @ 22,0 say ' Re-indexing '
      do ndx
      @ 20,0 clear

**************************

      case costing = '5'
    clos data
    set color to g+
    clear
    exit

**************************

endcase
@ 23 ,0 clear
WAIT '< Type any key to return to the main menu > ' to y
enddo
```

AUXØ PROGRAM

```
parameter code,con
do clean
do case
**********************************
  case code = '1'
       IF FLAG3 = 1
       DT = 'SHIP_DATE'
       ELSE
       DT = 'DATE'
       ENDIF
      set color to w/b+
      @ 1,60 say ' Select time unit '
      @ 2,60 say '   1> By year     '
      @ 3,60 say '   2> By month    '
      @ 4,60 say '   3> By day      '
      @ 5,60 say '   4> By week day '
      set color to g+/ ,b/w
      wait
=>  '   to an
      ******************************
       do case
       **********************
       case an = '3'
       do clean
       @ 1,0 say 'Is this going to be a One-Day period ? '
       wait '=> ' to y
       @ 2,0
       if y = 'y' .or. y = 'Y'
       @ 1,0 say 'Specify the Date You Want (like 12/01/84)'
       accept  '=> ' to date1
       if con = 'o'
          ct = ' dtoc(&dT) = ' + ['+ date1 + ']
          ct2 = ct
          ct3 = ct
          ct4 = ct
        else
          if upper(FLAG2) = 'O'
       ct = ct + ' .or. dtoc(&dt) = ' + ['] + date1 + ']
       ct2 = ct2 + ' .or. dtoc(&dt) = ' + ['] + date1 + ']
       ct3 = ct3 + ' .or. dtoc(&dt) = ' + ['] + date1 + ']
       ct4 = ct4 + ' .or. dtoc(&dt) = ' + ['] + date1 + ']
         else
       ct = ct + ' .and. dtoc(&dt) =  ' + ['] + DATE1 + ']
       ct2 = ct2 + ' .and. dtoc(&Dt) = ' + ['] + date1 + ']
       ct3 = ct3 + ' .and. dtoc(&dt) = ' + ['] + date1 + ']
       ct4 = ct4 + ' .and. dtoc(&dt) = ' + ['] +  date1 + ']
         endif
```

```
endif
else
do clean
@ 1,0 say  'Enter Starting Date (like 12/01/84)'
accept '=> ' to date1
@ 3,0 say 'Enter Ending Date '
accept '=> ' to date2
if con = 'o'
  ct = ' dtoc(&dt) > ' + ['+date1+ ']
  ct2 = ct
  ct3 = ct
  ct4 = ct
 else
  if upper(FLAG2) = 'O'
   condi =  ' .or.  dtoc(&dt) > ' + ['] + date1 + ']
   ct = ct + condi
   ct2 = ct2 + condi
   ct3 = ct3 + condi
   ct4 = ct4 + condi
  else
   condi = ' .and. dtoc(&dt) > ' + ['] + date1 + ']
   ct = ct + condi
   ct2 = ct2 + condi
   ct3 = ct3 + condi
   ct4 = ct4 + condi
  endif
endif
   condi = ' .and. dtoc(&dt) < ' + ['] + date2  + ']
   ct = ct + condi
   ct2 = ct2 + condi
   ct3 = ct3 + condi
   ct4 = ct4 + condi
endif
***********
case an = '2'
do clean
@ 1,0 say 'Specify month (like June,May ..)'
accept '=> ' to date1
date1 = upper(substr(date1,1,1)) + lower(substr(date1,2))
if con = 'o'
   ct = ' cmonth(&dt) = ' + ['] + date1 + ']
   ct2 = ct
   ct3 = ct
   ct4 = ct
  else
   if upper(FLAG2) = 'O'
   condi =  ' .or. cmonth(&dt) = ' + ['] + date1 + ']
   ct = ct + condi
```

```
    ct2 = ct2 + condi
    ct3 = ct3 + condi
    ct4 = ct4 + condi
    else
    condi =  ' .and. cmonth(&dt) = ' + ['] + date1 + [']
    ct = ct + condi
    ct2 = ct2 + condi
    ct3 = ct3 + condi
    ct4 = ct4 + condi
    endif
endif
 ***********
 case an = '1'
  do clean
  @ 1,0 say 'Specify year (like 1983,..) '
  accept '=> ' to date1
  if con = 'o'
  ct  = ' year(&dt) = ' + date1
  ct2 = ct
  ct3 = ct
  ct4 = ct
 else
 if upper(FLAG2) = 'O'
  condi =  ' .or. year(&ct) = ' + date1
  ct = ct + condi
  ct2 = ct2 + condi
  ct3 = ct3 + condi
  ct4 = ct4 + condi
 else
  condi =  ' .and. year(&dt) = ' + date1
  ct = ct + condi
  ct2 = ct2 + condi
  ct3 = ct3 + condi
  ct4 = ct4 + condi
 endif
 endif
 ************
 case an = '4'
 do clean
 @ 1,0 say 'Specify Week day ( 1(Sun),2(Mon), .. 7 ) '
 wait '=> ' to date1
 if con = 'o'
 cT  = 'dow(&dt) = ' + date1
 ct2 = ct
 ct3 = ct
 ct4 = ct
else
if upper(FLAG2) = 'O'
```

```
        condi =   ' .or. dow(&dt) = ' + date1
        ct = ct + condi
        ct2 = ct2 + condi
        ct3 = ct3 + condi
        ct4 = ct4 + condi
       else
        condi     = ' .and. dow(&dT) = ' +    date1
        ct = ct + condi
        ct2 = ct2 + condi
        ct3 = ct3 + condi
        ct4 = ct4 + condi
       endif
        endif
    *******
    endcase
    *******
*************************************************************
Case code = '4'
  FLAG0 = 'X'
  do clean
  @ 1,0 say 'Specify chemical number '
  accept  '=> ' to nm
  IF FLAG3 = 1
 if CON <> 'o'
    if upper(FLAG2) = 'O'
    ct = ct + ' .or. chname1 = ' + ['] + nm + ']
    ct2 = ct2 + ' .or. chname2 = ' + ['] + nm +[']
    ct3 = ct3 + ' .or. chname3 = ' + ['] + nm + ']
    ct4 = ct4 + ' .or. chname4 = ' + ['] + nm + ']
    else
    cT    = CT + ' .and.  chname1 = ' + ['] + nm + ']
    ct2 = ct2 + ' .and. chname2 = ' + ['] + nm + ']
    ct3 = ct3 + ' .and. chname3 = ' + ['] + nm + ']
    ct4 = ct4 + ' .and. chname4 = ' + ['] + nm + ']
    endif
 ELSE
   CT = 'chname1 = ' +   ['] + nm + ']
   ct2 = 'chname2 = ' + ['] + nm + ']
   ct3 = 'chname3 = ' + ['] + nm + ']
   ct4 = 'chname4 = ' + ['] +  nm + ']
  endif
ELSE
 if CON <> 'o'
    if upper(FLAG2) = 'O'
    ct = ct + ' .or. chem_num = ' + ['] + nm + ']
    else
    cT    = CT + ' .and.  chem_num = ' + ['] + nm + ']
    endif
```

```
 ELSE
   CT = 'chem_num = ' +    ['] + nm + [']
  endif
endif

*****************************************************
case code = 'S'
 if flag3 = 1
 do clean
 @ 1,0 say 'Enter Company EPA id '
 accept '=> ' to iden
 iden = upper(iden)
@ 3,0 say 'Is this a (G)enerator or (T)sd id '
wait '=> '  TO y
if upper(y) = 'G'
   condi =  ' Gen_id = ' + ['] + upper(iden) + [']
  else
   condi = ' tsd_id = ' + ['] + upoer(iden) + [']
endif

if CON <> 'o'
    if upper(FLAG2) = 'O'
     ct = ct + ' .or. ' + condi
     ct2 = ct2 + ' .or. ' + condi
     ct3 = ct3 + ' .or. ' + condi
     ct4 = ct4 + ' .or. ' + condi
    else
    cT    = CT  + ' .and. ' + condi
    ct2 = ct2 + ' .and. ' + condi
    ct3 = ct3 + ' .and. ' + condi
    ct4 = ct4 + ' .and. ' + condi
   endif
ELSE
    CT = CONDI
    ct2 = ct
    ct3 = ct
    ct4 = ct
endif
else
  @ 1,0 say 'Enter consignee name '
  accept '=> ' to id
  condi = ' consignee = ' + ['] + upper(id) + [']
if CON <> 'o'
    if upper(FLAG2) = 'O'
     ct = ct + ' .or. ' + condi
    else
    cT    = CT  + ' .and. ' + condi
   endif
```

```
ELSE
    CT = CONDI
endif

endif

*********************************************

case code = '6'

 FLAGO = 'X'
 do clean
 @ 1,0 say 'Specify chemical classs   '
 accept '=> ' to cls
 CLS = UPPER(CLS)
if flag3 = 1
   if CON <> 'o'
      if upper(FLAG2) = 'O'
       ct = ct + ' .or. class1 = ' + ['] + cls + ']
       ct2 = ct2 + ' .or. class2 = ' + ['] + cls + ']
       ct3 = ct3 + ' .or. class3 = ' + ['] + cls + ']
       ct4 = ct4 + ' .or. class4 = ' + ['] + cls + ']
      else
      cT  = CT + ' .and. class1 = ' + ['] + cls + ']
      ct2 = ct2 + ' .and. class2 = ' + ['] + cls + ']
      ct3 = ct3 + ' .and. class3 = ' + ['] + cls + ']
      ct4 = ct4 + ' .and. class4 = ' + ['] + cls + ']
     endif
   ELSE
      CT = 'class1 = ' + ['] + cls + ']
      ct2 = 'class2 = ' + ['] + cls + ']
      ct3 = 'class3 = ' + ['] + cls + ']
      ct4 = 'class4 = ' + ['] + cls + ']
   endif
else

   if CON <> 'o'
      if upper(FLAG2) = 'O'
       ct = ct + ' .or. class = ' + ['] + cls + ']
      else
      cT  = CT + ' .and. class = ' + ['] + cls + ']
     endif
   ELSE
      CT = 'class = ' + ['] + cls + ']
   endif

endif
*******************************
```

```
 case code = '7'

do clean
@ 1,0 say 'Specify you route code type  '
? '( M for macro code i.e. IF1,FT1, [default] )'
? '( S for Section code i.e. 1,2,3 ) '
wait      '=> ' to t
rt = ' '
if upper(t) = 'S'
  if flag1 <> 'x'
   do aux2
   rt = ' T1 = ' + ['] + 'a' + [']
  else
   do    aux2
   rt = 'o'
  endif
else
     DO CLEAN
     @ 1,0 SAY 'Please specify Shipment Route coding '
     accept '=> ' to rt
    rt    = ' route1 = ' + ['] + upper(rt) + [']
endif
 if flag3 = 1
  if rt <> 'o'
    if con <> 'o'
      if upper(flag2) = '0'
     ct = ct + ' .or. ' + rt
     ct2 = ct2 + ' .or. ' + rt
     ct3 = ct3 + ' .or. ' + rt
     ct4 = ct4 + ' .or. ' + rt
      else
     ct = ct + ' .and. ' + rt '
     ct2 = ct2 + ' .and. ' + rt
     ct3 = ct3 + ' .and. ' + rt
     ct4 = ct4 + ' .and. ' + rt
      endif

    else
      ct = rt
      ct2 = rt
      ct3 = rt
      ct4 = rt
    endif
  endif
else
  if rt <> 'o'
    if con <> 'o'
      if upper(flag2) = '0'
```

```
      ct = ct + ' .or. ' + rt
       else
      ct = ct + ' .and. ' + rt
       endif

     else
       ct = rt
     endif
   endif

endif


endcase

con='X'
```

AUX1 PROGRAM

```
parameters CDE,CON

* for database mani

    do clean
     @ 1 ,0 say 'Please specify City Name '
     accept '=> ' to cty
cty = upper(cty)
if cde = '2'
condi = ' city = ' + ['] + cty + [']
else
condi = ' city2 = ' + ['] + cty + [']
endif

IF CON <>'o'
 if upper(flag2) = 'O'
   CT = CT + ' .or. ' + CONDI
   CT2 = CT2 + ' .or. ' + CONDI
   CT3 = CT3 + ' .or. ' + CONDI
   CT4 = CT4 + ' .or. ' + CONDI
 else
   ct = ct + ' .and. ' + condi
   ct2 = ct2 + ' .and. ' + condi
   ct3 = ct3 + ' .and. ' + condi
   ct4 = ct4 + ' .and. ' + condi
 endif
else
  ct = condi
  ct2 = condi
  ct3 = condi
  ct4 = condi
endif
*************************************************************************
*
```

AUX2 PROGRAM

```
do clean
cnd = 'o'
cds = ' '
tt = ' '
set color to w/g+
@1,0
@2,0
@3,0
@4,0


do while .t.
   @ 21,0 clear
   @ 21,0 say ' Enter Section code ( 1..90 ) '
   accept '=> ' to cd
 @ 5,0
 @ 4,0
 @ 3,0
 @ 2,0
 set color to w/g+
 @ 1,0 say  -- Current Section Codes --
 cds = cds + '   ' + cd
 ? cds
@ 22,0 say ' Working , olease wait '

sele 1

if tt = ' '
repl t1 with 'a' for s1='&cd' .or.  s2='&cd' .or.  s3='&cd   .or.
s4='&cd' .or. s5='&cd' .or. s6='&cd' .or. s7='&cd' ;
 .or.  s8='&cd' .or.  s9='&cd' .or. s10='&cd' .or. s11='&cd' .or.
s12='&cd' .or. s13='&cd' .or. s14='&cd' .or. s15='&cd'
else
repl t2 with 'a' for s1='&cd'  .or.  s2='&cd'  .or.  s3= &cd'.or.
s4='&cd' .or. s5='&cd' .or. s6='&cd' .or. s7='&cd' ;
 .or.  s8='&cd' .or.  s9='&cd' .or. s10='&cd' .or. s11='&cd' .or.
s12='&cd' .or. s13='&cd' .or. s14='&cd' .or. s15='&cd'
repl t1 with ' ' for t1 = 'a' .and. t2 <> 'a'
repla t2 with ' '
endif


 @ 20,0 clear
 @ 20,0
 ? 'Do you want to specify another section code ? '
 wait '=> ' to y
```

```
@ 20,0 clear
if upper(y) = 'Y'
   loop
else
   @ 3,0
   @ 4,0
   exit



endif


enddo


set color to g+/
```

AUX3 PROGRAM

```
@ 1,0  clear
set color to w/g+
@4,0
@ 3,0
@ 2,0
@ 1,0
@ 1,0 say '-- Selected Criteria --
? ' '
?? ct
set color to g+/
@ 5,0 say  ' Working ! '
repl all t2 with ' '
nn=0
nm=0
nm1=0
nm2=0
nn1=0
nn2=0
nn3=0
nn4=0
select 1
? ' '
if flag3 = 1
  if flag0 = ' '
   SUM    quant1_lb,quant2_lb,quant3_lb,quant4_lb                to
wt1,wt2,wt3,wt4 for &ct
   SUM    vol1_gal,vol2_gal,vol3_gal,vol4_gal  to v1,v2,v3,v4 for
&ct
repl t2 with 's' for &ct
count to nn for t2 = 's'
count to nm1 for mani_tag = ' ' .and. t2 = 's'
count to nm2 for upper(mani_tag) = 'A' .and. t2 = 's'
nm = nm1 + nm2
 else
   sum quant1_lb,vol1_gal to wt1,v1 for &ct
   sum quant2_lb,vol2_gal to wt2,v2 for &ct2
   sum quant3_lb,vol3_gal to wt3,v3 for &ct3
   sum quant4_lb,vol4_gal to wt4,v4 for &ct4

repl all t2 with 's' for &ct
repl all t2 with 's' for &ct2
repl all t2 with 's' for &ct3
repl all t2 with 's' for &ct4

count to nn for t2 = 's'

count to nm1 for t2 = 's' .and. mani_tag= ' '
```

```
count to nm2 for t2 = 's' .and. Upper(mani_tag)='A'
nm = nm1 + nm2
  endif

WT5=WT1+WT2+WT3+WT4
V5=V1+V2+V3+V4

else
 sum gals,lbs to v5,wt5  for &ct
repl all t2 with 's' for &ct
  count to nn for t2 = 's'
count to nm1 for t2 ='s' .and. tag = ' '
count to nm2 for t2 = 's' .and. Upper(tag) ='A'
nm = nm1 + nm2
endif


@ 5,0
@ 9,0
a = 'r+/b'
b = 'w+/b'

@ 13,0 clear
set color to &b

@ 13,0 say '  Total weight                '
set color to &a
?? WT5
?? ' lbs  '
set color to &b
@ 14,0 say '  Total volume                '
set color to &a
?? V5
?? ' gals '
set color to &b
@ 15,0 SAY '  Number of records processed  '
set color to &a
?? nn
?? '       '
set color to &b
@ 16,0 say '  Number of shipments          '
set color to &a
??nm
?? '       '


set color to g+/
```

```
@ 1,0  clear
set color to w/g+
@4,0
@ 3,0
@ 2,0
@ 1,0
@ 1,0 say '-- Selected Criteria -- '
? ' '
?? ct
set color to g+/
@ 5,0 say  ' Working ! '
repl all t2 with ' '
nn=0
nm=0
nm1=0
nm2=0
nn1=0
nn2=0
nn3=0
nn4=0
select 1
? ' '
if flag3 = 1
  if flag0 = ' '
   SUM    quant1_lb,quant2_lb,quant3_lb,quant4_lb                to
wt1,wt2,wt3,wt4 for &ct
   SUM    vol1_gal,vol2_gal,vol3_gal,vol4_gal  to v1,v2,v3,v4 for
&ct
repl t2 with 's' for &ct
count to nn for t2 = 's'
count to nm1 for mani_tag = ' ' .and. t2 = 's'
count to nm2 for upper(mani_tag) = 'A' .and. t2 = 's
nm = nm1 + nm2
 else
   sum quant1_lb,vol1_gal to wt1,v1 for &ct
   sum quant2_lb,vol2_gal to wt2,v2 for &ct2
   sum quant3_lb,vol3_gal to wt3,v3 for &ct3
   sum quant4_lb,vol4_gal to wt4,v4 for &ct4

repl all t2 with 's' for &ct
repl all t2 with 's' for &ct2
repl all t2 with 's' for &ct3
repl all t2 with 's' for &ct4

count to nn for t2 = 's'

count to nm1 for t2 = 's' .and. mani_tag= ' '
```

```
count to nm2 for t2 = 's' .and. Upper(mani_tag)='A'
nm = nm1 + nm2
  endif

WT5=WT1+WT2+WT3+WT4
V5=V1+V2+V3+V4

else
 sum gals,lbs to v5,wt5  for &ct
repl all t2 with 's' for &ct
  count to nn for t2 = 's'
count to nm1 for t2 ='s' .and. tag = '
count to nm2 for t2 = 's' .and. Upper(tag) ='A'
nm = nm1 + nm2
endif


@ 5,0
@ 9,0
a = 'r+/b'
b = 'w+/b'

@ 13,0 clear
set color to &b

@ 13,0 say '  Total weight                    '
set color to &a
?? WT5
?? ' lbs  '
set color to &b
@ 14,0 say '  Total volume                    '
set color to &a
?? V5
?? ' gals '
set color to &b
@ 15,0 SAY '  Number of records processed  '
set color to &a
?? nn
?? '      '
set color to &b
@ 16,0 say '  Number of shipments            '
set color to &a
??nm
?? '      '


set color to g+/
```

AUX4 PROGRAM

```
parameters CODE CON
    do clean
     @ 1 ,0 say 'Please specify City Name '
     accept '=> ' to cty
      if code = '2'
   CONDI = ' port = ' + ['] + upper(cty) + [']
      else
    condi = ' city = ' + ['] + upper(cty) + [']
      endif
  if con = 'o'
   CT = CT + CONDI
   else
    if upper(flag2) = 'O'
       ct = ct + ' .or. ' + condi
    else
       ct = ct + ' .and. ' + condi
    endif
endif
*************************************************************************
*
con = 'X'
```

AUX5 PROGRAM

```
set color to w+/
@ 1,0 clear
text



Checking Generator & TSD id


endtext
sele 1
if lim = 0
count to lim
endif
select 2
use cpid
set index to indcp
store 1 to cnt


lm = lim


wait 'Do you want to search the entire database ? ' to offset
if upper(offset) = 'N'
   input  'Type in starting record # -> ' to cnt1
   cnt = cnt1
   cnt2 = lim
   input 'Type in ending record  # -> ' to cnt2
   if cnt2 < lim
     lm = cnt2
   else
     lm = lim
   endif
 else
   ? 'Search entire database'
 endif

select 1
go cnt


text
```

```
==========================================================================
==

    .....................Database  Report.........................

==========================================================================
==


endtext
do while cnt < i+1
    SELE 1
    store gen_id to a
    store tsd_id to b
    store mani_no to c
    select 2
    seek a

    if EOF()
       ?'--- Generator id not found --- '
       ?'record # -> '
       ?? cnt
       ??' Generator id -> '
       ??a
       go 1
    else
       c = city
       sele 1
       repl city with c
       sele 2
      endif

    seek b
    if EOF()
       ?'---- TSD id not found ---- '
       ?'record # -> '
       ?? cnt
       ??' TSD id -> '
       ?? b
       go i
   else
     c = city
     sele 1
     repl city with c
     sele 2
      endif
```

AUX6 PROGRAM

```
set color to w+
* for meni
sele 1
if lim = 0
count to lim
endif
select 3
use TRA index indTC
store  0 to cnt
@ 1,0 clear
lm = lim
TEXT


=============================================================
=
    THIS PROGRAM WILL CHECK SHIPMENT ROUTE DATABASE AND REPORT ANY

    UNDEFINED ROUTES.

=============================================================
=

ENDTEXT

wait 'Do you want to search the entire database ? ' to offset
 if upper(offset) = 'N'
    input 'Type in starting record # -> ' to cnt1
    cnt = cnt1-1
    cnt2 = lim
    input 'Type in ending record # -> ' to cnt2
    if cnt2 < lim
      lm = cnt2
    else
      lm = lim
    endif
  else
   ? 'Search entire database'
  endif

do while cnt < lm
  select 1
  cnt = cnt + 1
  go cnt
  store city to g
  store city2 to t
```

```
if route1 = ' '

  sele 3
  seek g
  if eof()      .

      ? '******* Route undefined *******'
      ? ' RECORD #  =  '
      ?? CNT
      ? 'From city - '
      ?? G
      ??  '  to - '
      ?? T
      ? ' '
  else
     do while city = g .and. city2 <> t
        skip
         enddo
     if t = city2
       r = route
       ss1 = sec1
       ss2 = sec2
       ss3 = sec3
       ss4 = sec4
       ss5 = sec5
       ss6 = sec6
       ss7 = sec7
       ss8 = sec8
       ss9 = sec9
       ss10 = sec10
       ss11 = sec11
       ss12 = sec12
       ss13 = sec13
       ss14 = sec14
       ss15= sec15
       sele 1
       repl route1 with r
       repl s1 with ss1
       repl s2 with ss2
       repl s3 with ss3
       repl s4 with ss4
       repl s5 with ss5
       repl s6 with ss6
       repl s7 with ss7
       repl s8 with ss8
       repl s9 with ss9
       repl s10 with ss10
       repl s11 with ss11
```

```
        repl s12 with ss12
        repl s13 with ss13
        repl s14 with ss14
        repl s15 with ss15
      else
       ? '******* Route undefined *******'
       ? ' RECORD # = '
       ?? CNT
       ? 'From city - '
       ?? G
       ?? '   to - '
       ?? T
       ? ' '
     endif

  endif

endif

enddo

TEXT

=============================================================================


ENDTEXT
set color to g+/
```

```
   select 1
   cnt=cnt + 1
   go cnt
 enddo


text

   ========================        end          of          checking
============================


endtext

set color to g+/ ,b/w
```

AUX7 PROGRAM

```
set color to w+
sele 1
if lim = 0
count to lim
endif

lm = lim
cnt = 0

wait 'Do you want to search the entire database ? ' to of
if upper(of) = 'N'
  input 'Type in starting record # -> ' to cnt1
  cnt = cnt1 -1
  cnt2 = lim
  input 'Type in ending record # -> ' to cnt2
  if cnt2 < lim
   lm = cnt2
   else
    lm = lim
   endif
else
  ? 'Search entire database '
endif
@ 1,0 clear
SELECT 4
USE CLNM INDEX INDCL

DO WHILE CNT < LIM
   CNT = CNT + 1
   SELECT 1
   GO CNT
   ? 'Searching  -> '
   ?? CNT
   ? ' '
   ? ' '
   C1 = ' '
   C2 = ' '
   C3 = ' '
   C4 = ' '
   n1 = ' '
   n2 = ' '
   n3 = ' '
   n4 = ' '
  if flag3 = 1
   N1 = CHNAME1
   N2 = CHNAME2
```

```
 N3 = CHNAME3
 N4 = CHNAME4
 CL1 = CLASS1
 CL2 = CLASS2
 CL3 = CLASS3
 CL4 = CLASS4
else
 n1 = chem_num
 cl1 = class
endif

 SELECT 2


IF N1 <> ' '
 SEEK N1
 IF EOF()
    ? ' ***** COULD NOT FIND CLASS FOR THIS CHEMICAL ***** '
   ? ' ----> '
   ?? N1
   ? ' RECORD # '
   ?? CNT
   ? ' POSSIBLE CLASS -> '
   ?? CL1
 ELSE
   C1 = CLASS
 ENDIF
ENDIF

if flag3 = 1

IF N2 <> ' '
  SEEK N2
  IF EOF()
     ? ' ***** COULD NOT FIND CLASS FOR THIS CHEMICAL ***** '
    ? ' ----> '
    ?? N2
    ? ' RECORD # '
    ?? CNT
    ?' POSSIBLE CLASS ->    '
    ?? CL2
  ELSE
    C2 = CLASS
  ENDIF
ENDIF

IF N3 <> ' '
   SEEK N3
```

```
   IF EOF()
      ? ' ***** COULD NOT FIND CLASS FOR THIS CHEMICAL ***** '
     ? ' ----> '
     ?? N3
     ? ' RECORD # '
     ?? CNT
     ?' POSSIBLE CLASS -> '
     ?? CL3
   ELSE
     C3 = CLASS
   ENDIF
ENDIF


IF N4 <> ' '
   SEEK N4
   IF EOF()
      ? ' ***** COULD NOT FIND CLASS FOR THIS CHEMICAL ***** '
     ? ' ----> '
     ?? N4
     ? ' RECORD # '
     ?? CNT
     ?' POSSIBLE CLASS -> '
     ?? CL4
   ELSE
     C4 = CLASS
   ENDIF
ENDIF

endif

 ENDDO

? ' ====== end of checking ======='
? '
```

AUX10 PROGRAM

```
 CLEAR
@1,0 say '--- DATABASE AVAILABLE  ---'
@2,0
DIR *.DBF
* 6,0 clear

DO WHILE .T.
@23,0
@22,0
ACCEPT 'CHOOSE YOUR DATABASE => ' TO DB
  IF UPPER(SUBSTR(DB,1,1)) = 'M'
    FLAG3 = 1
    EXIT
  ELSE
    IF UPPER(SUBSTR(DB,1,1)) = 'H'
    FLAG3 = 2
    EXIT
    ENDIF
  ENDIF
? 'Not a correct database '
ENDDO
sele 1
USE &DB
clear


  set color to r/
  @ 0,50 SAY 'MAIN DATABASE : '
  set color to w/
  ?? DB
  SET COLOR TO G+/
```

DIAG PROGRAM

```
set color to b+/
@ 1,0 clear
text

  Database diagnosis utility


  Select the item you want to be checked

   1> Generator & TSD id

   2> Route

   3> Chemical Class

 endtext

wait '  => ' to an

wait 'Do you need printer ? ' to p
if upper(p) = 'Y'
  set print on
endif



 do case
   case an = '1'
     do aux5
   case an = '2'
     do aux6
   case an = '3'
     do aux7
 endcase


set color to g+/

set print off
```

N D X PROGRAM

```
sele 2
use cpid
index on id to indcp
sele 4
use clnm
index on class to indcl
sele 3
USE TRA
INDEX ON CITY TO INDTC
SELE 1
```