



ARIZONA DEPARTMENT OF TRANSPORTATION

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CONSTRUCTION OFFICE AUTOMATION VOLUME III

Final

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16. ABSTRACT This research project was aimed at increasing the productivity of construction, office, and laboratory functions. Application of microcomputer procedures in highway construction has replaced existing manual procedures for construction progress estimate processing and material test computations. The project has enhanced the information flow to project engineers, area engineers, district engineers and headquarter managers in an efficient manner. It has developed a total microcomputer hardware/software configuration that enables interfacing with the mainframe computer. The existing field office personnel can operate each of the systems with less than one week training of each system. The final report of this study is divided into three volumes: Volume I. - Final Report Volume II. - Construction Progress Estimate Manual Volume III. - Construction Material Testing Manual Volume I - Final Report describes the system hardware selection process and the development, implementation, training, conclusions, and recommendations for each of the Construction Progress Estimate and Construction Material Testing systems.					
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CONSTRUCTION MATERIALS TESTING MANUAL

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INTRODUCTION

This manual outlines ADOT'S Construction Materials Testing (CMT) procedures for calculating, checking, and logging of material tests in a project laboratory using a microcomputer. It is intended to serve as both a Systems and Users Manual for use by Construction Managers at all levels.

Chapter 1 presents a look at Construction Materials Testing at the project level, and gives an overview of the program modules and their applications.

Chapter 2 through 10 presents a combination of menus and program modules that address each area of material testing. They are written in a manner to attempt the following:

1. Logical reading from beginning to end.
2. As a resource document for the user.
3. A training document referring to example test samples listed in APPENDIX D.

Appendix A ==> INSTALLATION: Getting started.

Appendix B ==> BACKUP: How to protect the work invested.

Appendix C ==> RECOVERY: What to do when something goes wrong.

Appendix D ==> TEST PROJECT - MATERIAL SAMPLES

Appendix E ==> Contains reports associated with the TEST PROJECT samples and others as an example.

APPENDIX F ==> SYSTEM DOCUMENTATION.

APPENDIX G ==> MAINFRAME AND PC QUERY

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 1.0 ---- SYSTEM OVERVIEW
SECTION 1.0 ---- INTRODUCTION

The process of calculating and logging of material tests in project laboratories has changed very little over the years. This system or collection of program modules is an attempt to automate some of the tedious time consuming calculations and reporting of tests associated with good quality control on construction projects. The system as is should be able to accommodate most of the standard tests now being performed in project laboratories. Because material, material specifications and testing methods do vary significantly from project to project and year to year, an all encompassing "MATERIAL PROGRAM" to cover every condition is not available within the scope of this attempt.

Test examples are used throughout the manual and if applicable have been extracted directly from the "ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS TESTING MANUAL".

Where possible, the programs have been written so as not to restrict the applications as they are being used today. For clarification, two examples of this are:

- + The gradation specification module is written to accommodate a Fine Aggregate for grouting from a 3" sieve to a PI. No range restrictions due to reasonable or current logic.
- + The bin composite module allows up to 5 bins, and ranges from 3" to #200 with additive. Should accommodate all possibilities.

As quality control requirements change and affect the usefulness of these programs, the programs will have to be changed or replaced with new ones.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 1.0 ---- SYSTEM OVERVIEW
SECTION 1.1 ---- APPLICATIONS

The system in all its program modules utilizes existing source document forms now being used throughout ADOT in construction material testing. No additional documents or forms are required to use the microcomputer procedures.

The system features include the following application components:

- + One time entry of Project Material Specifications for a material in areas of gradations, proctors, asphalt concrete mix designs, and concrete mix designs.
- + Daily entry of laboratory and field tests raw data from existing forms.
- + Make calculation checks of data and log test to a permanent file.
- + Make corrections or delete records in all files containing project related data.
- + Produce working documents or work sheets for field technicians.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 1.0 ---- SYSTEM OVERVIEW

SECTION 1.2 ---- ORGANIZATION

The Data Base Organization is a collection of records generated by entering material sample test data taken from field and laboratory work documents. A unique record identifier labeled a 'Record Type', defines the data elements for all processing.

All records are written to the Daily File for editing until they are uploaded to the mainframe. The records are then moved to the Weekly File for further editing and report writing. After the weekly report is produced they are then moved to multiple Project Historical Files.

The programs write to and read data from other files which are of a support nature. These files hold information associated with material specifications, proctors, asphaltic concrete mix designs, and portland cement concrete mix designs. Each project within this group has its own files.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 1.0 ---- SYSTEM OVERVIEW

SECTION 1.3 ---- REPORTING

The CMT system yields the following reports.

- + Produce Weekly Project Log Reports for Central Materials, Area Engineers, Project Engineers and Engineering Technicians.
- + Produce Historical Project Reports containing all material tests entered into the system.
- + Produce statistical analysis reports on some material tests groupings.
- + Every screen image containing input or calculated data can be printed.

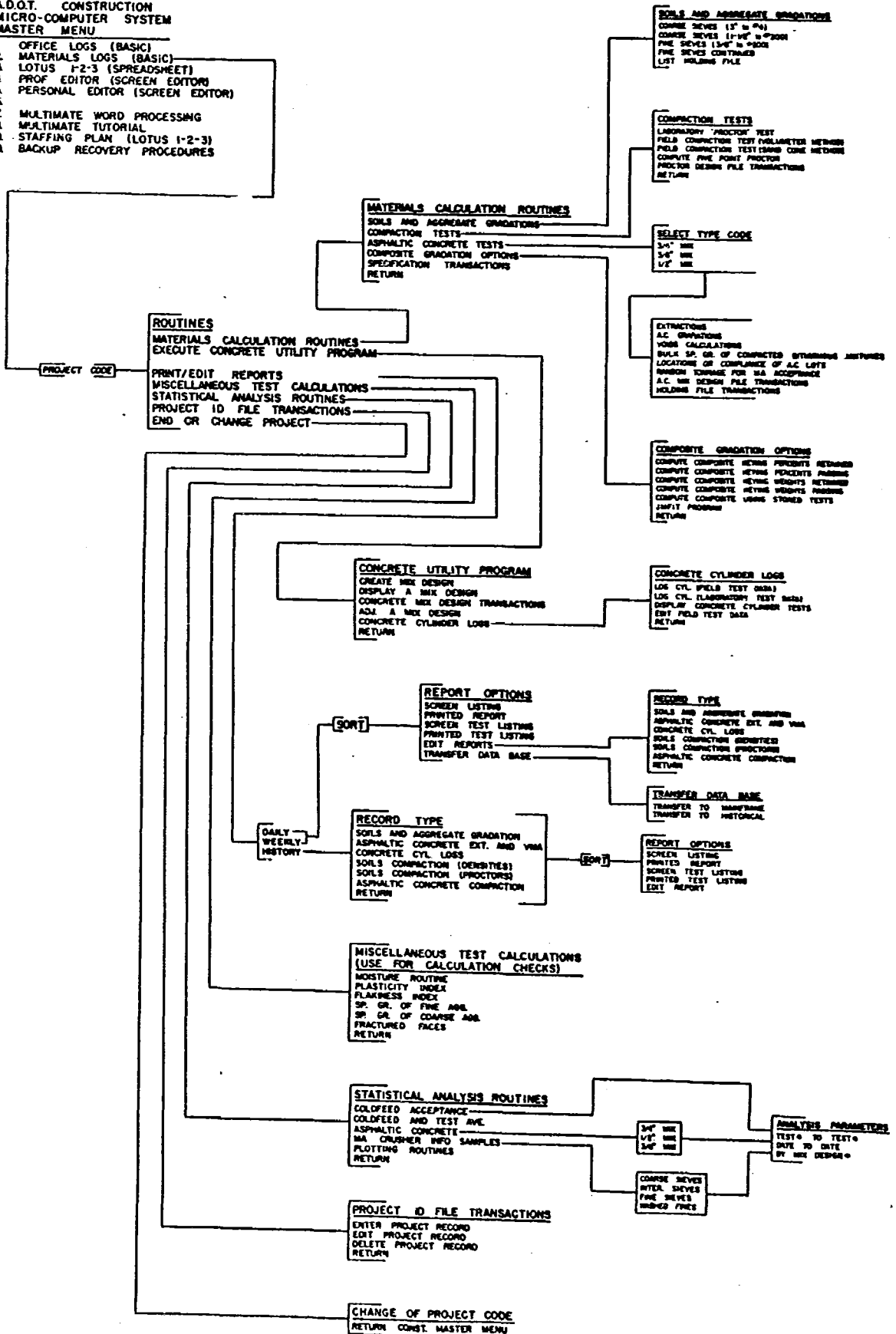
Samples of these reports are located in appendix E.

CMT

8-13-88

A.D.Q.T. CONSTRUCTION MICRO-COMPUTER SYSTEM MASTER MENU

1. OFFICE LOGS (BASIC)
2. MATERIALS LOGS (BASIC)
3. LOTUS 1-2-3 (SPREADSHEET)
4. PROF EDITOR (SCREEN EDITOR)
5. PERSONAL EDITOR (SCREEN EDITOR)
- 6.
7. MULTIMATE WORD PROCESSING
8. MULTIMATE TUTORIAL
9. STAFFING PLAN (LOTUS 1-2-3)
10. BACKUP RECOVERY PROCEDURES



*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 2.0 -- MASTER MENU
SECTION 1.0 -- OPTIONS

Screen Image 2.1 is the operating system screen and the first image that appears to an operator after starting the computer. The operator should type the number (2) to use the Construction Materials System.

ADOT CONSTRUCTION MICRO-COMPUTER SYSTEM MASTER MENU	
1. Office Logs	(Basic)
2. Materials Logs	(Basic)
3. Lotus 1-2-3	(Spreadsheet)
4. Prof Editor	(Screen Editor)
5. Personal Editor	(Screen Editor)
6.	
7. Word Processing	(Multimate)
8. Multimate Tutorial	
9. Staffing Plan	(Lotus 1-2-3)
10. Backup & Recovery Procedures	

SCREEN IMAGE 2.1

Screen Image 2.2 is the first screen of the CMT system. The question asked of the operator is "What project are we going to work on?". Enter the PROJECT CODE associated with a listed project. If your project is not listed, then pick any one listed and the NEXT SCREEN will allow you access to a menu named "PROJECT ID FILE TRANSACTIONS" that among other options will let you BUILD A NEW PROJECT.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER PROJECT CODE

SCREEN IMAGE 2.2

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 2.0 -- MASTER MENU
SECTION 1.0 -- OPTIONS

After entering PROJECT CODE, SCREEN IMAGE 2.3 is the next screen you will see. The only difference is the addition of CHAPTERS and SECTIONS enclosed in parenthesis (). These will always be shown in the manual to aid you in finding the correct application instructions.

The "BOUNCE BAR POSITION" or selection will always be represented with a row of asterisks. *****

*
*****:*****

When in a Bounce Bar Menu the Esc key may always be used to go directly to the previous menu.

EXAMPLE:

Choosing "MATERIALS CALCULATION ROUTINES" you will go to Chapter 3.1.0 to select next menu. NO Section is shown. A section WHEN SHOWN WILL BE PRECEDED BY A HYPHEN - SUCH AS (3.1.1-1.1).

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT # = IXF-084-1(0)
RE/SUPERVISOR = MR T

NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION

ROUTINES

* (3.1.0) MATERIALS CALCULATION ROUTINES *

(4.1.0) EXECUTE CONCRETE UTILITY PROGRAM
(5.1.0) PRINT/EDIT REPORTS
(7.1.0) MISCELLANEOUS TEST CALCULATIONS
(8.1.0) STATISTICAL ANALYSIS ROUTINES
(9.1.0) PROJECT ID FILE TRANSACTIONS
(10.1.0) END OR CHANGE PROJECTS

SCREEN IMAGE 2.3

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.0 -- LABORATORY CALCULATION ROUTINES
SECTION 1.0 ---- OPTIONS

Having chosen "MATERIALS CALCULATION ROUTINES" from your previous menu, you have a NEW MENU with OPTIONS as shown in SCREEN IMAGE 3.01.

EXAMPLE:

Choosing "SOILS AND AGGREGATE GRADATIONS" you will go to Chapter 3.1.1 to select next menu.

```
*****
*
*   NOTE:
*   If you have not entered Sieve Specifications associated with
*   your material previous to this procedure, you should select
*   "SPECIFICATION TRANSACTIONS" first. After completing spec entry,
*   go to "SOILS AND AGGREGATE GRADATIONS".
*
*****
```

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

MATERIAL CALCULATION ROUTINES

```
*****
* (3.1.1)          SOILS AND AGGREGATE GRADATIONS *
*****
(3.1.2)          COMPACTION TESTS
(3.1.3)          ASPHALTIC CONCRETE TESTS
(3.1.4)          COMPOSITE GRADATIONS
(3.1.5)          SPECIFICATION TRANSACTIONS
RETURN
```

SCREEN IMAGE 3.01

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.0 ---- OPTIONS

Having chosen "SOILS AND AGGREGATE GRADATIONS" from your previous menu, you have a NEW MENU with OPTIONS as shown in SCREEN IMAGE 3.02.

EXAMPLE:

Choosing "COARSE SIEVES 3" TO #4" you will go to Chapter 3.1.1, Section 1.1 for first prompting screen.

```
-----  
ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM  
  
PROJECT CODE      PROJECT NUMBER      PROJECT NAME  
1112              IXF-084-(0)          ***** TEST PROJECT *****  
  
SOILS AND AGGREGATE GRADATIONS  
  
*****  
* (3.1.1-1.1)      COARSE SIEVES 3" To #4      *  
*****  
(3.1.1-1.2)      COARSE SIEVES 1 1/2" To #200  
  
(3.1.1-1.3)      FINE SIEVES 3/8" To #200  
  
(3.1.1-1.4)      FINE SIEVES CONTINUED  
  
(3.1.1-1.5)      LIST HOLDING FILE  
  
-----  
SCREEN IMAGE 3.02  
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.1 ---- COARSE SIEVES 3" TO #4

Having chosen "COARSE SIEVES 3" To #4" from the previous menu, the computer will now print a screen image containing statements for which you are to respond with the correct information.

If the statements contain dots where information is to be entered, then the backspace key, backtab key, enter, and the left and right cursor keys may be used. The backspace key works by deleting the last character on the line if the user is past the last character. The backtab key moves the cursor to the previous line, or if on the top line, then to the bottom line. The enter key moves the cursor to the next line, or if on the bottom line, then the choices for that screen will appear at the bottom of the screen. The program assumes you will be using the keypad to enter numbers except on Bounce Bar Menus; therefore, if you wish to use the left and right cursor keys, pressing NumLock directly above the keypad will activate them. Pressing NumLock again will restore the keypad to numbers.

If the statements that appear do not contain dots and appear one at a time then only the backspace key and enter key may be used. Do not attempt to use any other screen editing keys.

The first screen will prompt you as shown in SCREEN IMAGE 3.03. Keying in the responses as requested will take you to the next screen shown in SCREEN IMAGE 3.04.

```
-----  
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM  
  
PROJECT CODE      PROJECT NUMBER      PROJECT NAME  
  1112            IXF-084-(0)          ***** TEST PROJECT *****  
  
MATERIAL CODE    EM                    <==== A  
TYPE CODE ..      <==== A1  
SPEC #    1       <==== A2  
TOTAL SAMPLE WEIGHT  5100.    <==== B  
  
-----  
                SCREEN IMAGE    3.03  
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.1 ---- COARSE SIEVES 3" To #4

The examples we will use are taken directly from the "ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS TESTING MANUAL" whenever possible. This example will use FIGURE #3 of Section SERIES 200 - SOIL & AGGREGATE. This is reproduced in the appendix as EXAMPLE #1.

EXAMPLE #1 EXAMPLE #1 EXAMPLE #1 EXAMPLE #1

Keying in the data as shown in SCREEN IMAGE 3.04, you will proceed to SCREEN IMAGE 3.05 showing INPUT data and all CALCULATED data to complete coarse sieve analysis. If correct ENTER a "C" and you will move to the FINE portion of sieve analysis.

If fine sieves are to be entered later, enter an "L" and you will move to the "Tabulation Screen", Screen Image 3.10. Upon completing the data required, you may enter an "H" and the partially completed test data will be stored in a HOLDING FILE for later retrieval.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

SIEVE	WEIGHT	COARSE SIEVES
3"	<=== C
2 1/2"	<=== D
2"	<=== E
1 1/2"	<=== F
1"	<=== G
3/4"	<=== H
1/2"	360.	<=== I
3/8"	880.	<=== J
1/4"	1300	<=== K
#4	380.	<=== L
-#4	2180	<=== M

SCREEN IMAGE 3.04

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.1 ---- COARSE SIEVES 3" TO #4

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER		PROJECT NAME	
1112	IXF-084-(0)		***** TEST PROJECT *****	

SIEVE	WEIGHT	% RET.	% PASS.	SPECIFICATION	N TEST AVG.
3"	0	0	100	X	
2 1/2"	0	0	100		
2"	0	0	100		
1 1/2"	0	0	100		
1"	0	0	100	X	
3/4"	0	0	100		
1/2"	360	7	93		
3/8"	880	17	76	X	
1/4"	1300	26	50		
#4	380	7		X	
-#4	2180		43 (42.7)		
TOTAL =	5100				

CONTINUE	LOG	QUIT
----------	-----	------

SCREEN IMAGE 3.05

Continuing with fine portion of sieve analysis, the program will first prompt you as shown in SCREEN IMAGE 3.06 and will then proceed to SCREEN IMAGE 3.07 for further prompting.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER TOTAL DRY WT. OF SPLIT SAMPLE 539 <==== N

SCREEN IMAGE 3.06

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.1 ---- COARSE SIEVES 3" TO #4

Completing entry as exhibited in SCREEN IMAGE 3.07 the INPUT and CALCULATED data will print as shown in SCREEN IMAGE 3.08.

If all calculations are correct, we will now opt to LOG RESULTS by entering an "L". SCREEN IMAGE 3.09 will appear.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112	PROJECT NUMBER IXF-084-(0)	PROJECT NAME ***** TEST PROJECT *****
----------------------	-------------------------------	--

SIEVE	WEIGHT	RET.	
#8	102.	<=====	P
#10	84..	<=====	Q
#16	76..	<=====	R
#30	68..	<=====	S
#40	54..	<=====	T
#50	41..	<=====	U
#100	12..	<=====	V
#200	44..	<=====	W
-#200	1..	<=====	X

SCREEN IMAGE 3.07

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112	PROJECT NUMBER IXF-084-(0)	PROJECT NAME ***** TEST PROJECT *****
----------------------	-------------------------------	--

SIEVE	WEIGHT	% RET.	% PASS.	SPECIFICATION	N TEST AVG.
#8	102	8	35		
#10	84	7	28		
#16	76	6	22		
#30	68	5	17		
#40	54	4	13		
#50	41	3	10		
#100	12	1	9	X	
#200	44	4		X	
-#200	1		4.6		
TOTAL =	482				
ELUT =	57				

LOG QUIT

SCREEN IMAGE 3.08

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.1 ---- COARSE SIEVES 3" To #4

The next information requested is represented on SCREEN IMAGE 3.09.
If no LL or PL tests have been run, simply press enter and ZERO VALUES
for each variable will be retained in the record. Next, SCREEN IMAGE 3.10
will prompt you for information as recorded on the "SAMPLE TABULATION"
part of the document.

After completing the screen, keying the first letter of the word
describing the action wanted will execute that action. LOG will write the
record to the DAILY FILE. REMARKS will LOG the test and bring up the
REMARKS editor. CORRECTION will allow you to go back and correct any
errors on the screen. QUIT takes you directly to the previous menu and no
record will be logged. Keying an "R", we move to SCREEN IMAGE 3.10A.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER PI or F/INDEX (##)	<==== Z
ENTER SAND EQUIVALENT or % CRUSHED FACES (##)	<==== AA
ENTER PERCENT MOISTURE	<==== AB

SCREEN IMAGE 3.09

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

PROJ. CODE	MATL	TYPE	PUR	LAB	SPEC #	SIZE	SIZE %
1112	EM	..	I	P	1	.	..

TEST #	SUFFIX	SAMPLED BY	DATE	TIME
1...	..	J JONES.	072184	1212

LIFT #	SAMPLED FROM	RDWY	STATION
4.	20' LEFT C/L.....	EB	114+50.

P/E CODE	RDWY	STATION OR PIT #
E	WB	188+50.

LOG	REMARKS	(HOLD)	CORRECTION	QUIT
-----	---------	--------	------------	------

SCREEN IMAGE 3.10

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.1 ---- COARSE SIEVES (3" To #4)

The remarks editor as shown in SCREEN IMAGE 3.10A is a full screen editor. Each full line of text is represented by two entry lines and will be shown as one line when printed. The beginning of each full line is numbered for your reference. You may include up to 96 full lines of remarks information with any one test. The editor allows full use of all screen editing keys on the keypad and the backspace key. When entry is complete, PRESS the F1 key and your remarks will be saved. Pressing the Esc key will exit the program and no remarks will be saved. After making the proper choice, the program prompts you with "MULTIPLE PROJECT DISTRIBUTION" or "RETURN". By keying an "M", the logging screen will reappear. This is provided for laboratory testing of samples that are to be distributed to MULTIPLE PROJECTS. Change the project code and any other required data as shown on the screen and proceed as before.

NOTE: For more detailed information on the LOGGING and REMARKS EDITOR see APPENDIX

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

COMMENTS	1
Key in any remarks	2
you wish to make	3
in the space to	4
the right. Each	5
numbered line will	6
be one print line	7
on the printer.	8
F1 save and exit	
Esc exit only	

MULTIPLE PROJECT DISTRIBUTION RETURN

SCREEN IMAGE 3.10A

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.2 ---- COARSE SIEVES 1 1/2" To #200

Having chosen "COARSE SIEVES 1 1/2" To #200" from the previous menu, the computer will now print a screen image containing statements for which you are to respond with the correct information.

The examples we will use are taken directly from the "ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS TESTING MANUAL" whenever possible. However, this example will use EXAMPLE #2 in the APPENDIX of this manual.

EXAMPLE #2 EXAMPLE #2 EXAMPLE #2 EXAMPLE #2

The first screen will be as shown in SCREEN IMAGE 3.11. Keying in the responses requested will take you to the next screen shown in SCREEN IMAGE 3.12.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM		
PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****
MATERIAL CODE EH		<==== A
TYPE CODE ..		<==== A1
SPEC # 1		<==== A2
TOTAL SAMPLE WEIGHT 1015		<==== B

SCREEN IMAGE 3.11

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.2 ---- COARSE SIEVES 1 1/2" TO #200

Keying in the data as shown in SCREEN IMAGE 3.12, you will proceed to SCREEN IMAGE 3.13 showing INPUT data and all CALCULATED data to complete coarse sieve analysis. If all calculations are correct, we will now opt to LOG RESULTS by entering an "L".

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

SIEVE	WEIGHT	COARSE SCREENS
1 1/2"	<==== C
1"	<==== D
3/4"	93..	<==== E
1/2"	194.	<==== F
3/8"	75..	<==== G
1/4"	179.	<==== H
#4	96..	<==== I
#8	87..	<==== J
#10	50..	<==== K
#16	85..	<==== L
#30	57..	<==== M
#40	22..	<==== N
#50	23..	<==== O
#100	28..	<==== P
#200	26..	<==== Q
-#200	...	<==== R

SCREEN IMAGE 3.12

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.2 ---- COARSE SIEVES 1 1/2" TO #200

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE		PROJECT NUMBER		PROJECT NAME
1112		IXF-084-(0)		***** TEST PROJECT *****

SIEVE	WEIGHT	% RET.	% PASS.	SPECIFICATION	N TEST AVG.
1 1/2"	0	0	100		
1"	0	0	100		
3/4"	93	9	91		
1/2"	194	19	72		
3/8"	75	7	65		
1/4"	179	18	47		
#4	96	9	38		
#8	87	9	29		
#10	50	5	24		
#16	85	8	16		
#30	57	6	10		
#40	22	2	8		
#50	23	2	6		
#100	28	3	3		
#200	26	3			
-#200	0		0		
TOTAL =	1015				
ELUT =	0				

LOG QUIT

SCREEN IMAGE 3.13

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.2 ---- COARSE SIEVES 1 1/2" to #200

The next information requested is represented on SCREEN IMAGE 3.14
If no LL or PL tests have been run, simply press enter and ZERO VALUES
for each variable will be retained in the record. Next, SCREEN IMAGE 3.15
will prompt you for information as recorded on the "SAMPLE TABULATION"
part of the document.

After completing the screen you may enter an "L" and all test data
will be written to the "DAILY HOLDING FILE". If you make a mistake in
an entry on this screen, key in a "C" and the CURSOR will return to the
beginning.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****
ENTER PI or F/INDEX (##)		<==== Z
ENTER SAND EQUIVALENT or % CRUSHED FACES (##)		<==== AA
ENTER PERCENT MOISTURE		<==== AB

SCREEN IMAGE 3.14

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

PROJ. CODE	MATL	TYPE	PUR	LAB	SPEC #	SIZE	SIZE #
1112	EM	..	I	P	1	.	..

TEST #	SUFFIX	SAMPLED BY	DATE	TIME
6...	.	J JONES.	072184	0130

LIFT #	SAMPLED FROM	RDWY	STATION
5.	130' RT C/L.....	WB	120+75.

P/E CODE	RDWY	STATION OR PIT #
P	..	#6670

LOG	REMARKS	CORRECTION	QUIT
-----	---------	------------	------

SCREEN IMAGE 3.15

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.3 ---- FINE SIEVES 3/8" TO #200

Having chosen "FINE SIEVES 3/8" to #200" from the previous menu, the computer will print a screen image containing statements for which you are to respond with the correct information.

The examples we will use are taken directly from the "ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS TESTING MANUAL", whenever possible. This example will use FIGURE #6 of Section SERIES 200 - SOIL & AGGREGATE. This is reproduced in the appendix as EXAMPLE #3.

EXAMPLE #3 EXAMPLE #3 EXAMPLE #3 EXAMPLE #3

The first screen will prompt you as shown in SCREEN IMAGE 3.16. Keying in the responses as requested will take you to the next screen shown in SCREEN IMAGE 3.17.

```
-----  
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM  
  
PROJECT CODE      PROJECT NUMBER      PROJECT NAME  
  1112            IXF-084-(0)        ***** TEST PROJECT *****  
  
ENTER MATERIAL CODE   FA                <==== A  
ENTER TYPE CODE      GR                <==== A1  
ENTER SPEC #         1                 <==== A2  
ENTER TOTAL DRY WT. OF SPLIT SAMPLE  562        <==== B  
  
-----  
                SCREEN IMAGE      3.16  
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.3 ---- FINE SIEVES (3/8" TO #200)

Keying in the data as shown in SCREEN IMAGE 3.17, you will proceed to SCREEN IMAGE 3.18 showing INPUT data and all CALCULATED data to complete fine sieve analysis. If all calculations are correct, we will now opt to LOG RESULTS by entering an "L".

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

SIEVE	WEIGHT RET.	
3/8"	?	<==== C
1/4"	? 8	<==== D
#4	? 13	<==== E
#8	? 13	<==== F
#10	? 42	<==== G
#16	? 93	<==== H
#30	? 67	<==== I
#40	? 123	<==== J
#50	? 41	<==== K
#100	? 121	<==== L
#200	? 24	<==== M
-#200	? 2	<==== N

SCREEN IMAGE 3.17

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

SIEVE	WEIGHT	% RET.	% PASS.	SPECIFICATION	3 TEST AVG.
3/8"	0	0	100	100	
1/4"	8	1	99		
#4	13	3	96	94-100	
#8	13	2	94		
#10	42	7	87		
#16	93	17	71	45-80	
#30	67	12	58		
#40	123	23	35		
#50	41	7	28	0-30	
#100	121	21	7	0-10	
#200	24	4		0-4.0	
-#200	2		3		
TOTAL =	547				
ELUT =	15				
F/H = 2.42					

LOG QUIT

SCREEN IMAGE 3.18

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.3 ---- FINE SIEVES (3/8" to #200)

The next information requested is represented on SCREEN IMAGE 3.19. If no LL or PL tests have been run, simply press enter and ZERO VALUES for each variable will be retained in the record. Next SCREEN IMAGE 3.20 will prompt you for information as recorded on the "SAMPLE TABULATION" part of the document.

After completing the screen you may enter an "L" and all test data will be written to the "DAILY HOLDING FILE". If you make a mistake in an entry on this screen, key in a "C" and the CURSOR will return to the beginning.

```

-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
    1112                IXF-084-(0)          ***** TEST PROJECT *****

ENTER PI or F/INDEX (##)                <==== Z
ENTER SAND EQUIVALENT or % CRUSHED FACES (##)  <==== AA
ENTER PERCENT MOISTURE _                  <==== AB
  
```

SCREEN IMAGE 3.19

```

-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
    1112                IXF-084-(0)          ***** TEST PROJECT *****

PROJ. CODE   MATL   TYPE   PUR   LAB   SPEC #   SIZE   SIZE #
    1112       FA    GR    A    P     1       .     ..

TEST #   SUFFIX   SAMPLED BY   DATE       TIME
  18..    .       J JONES.    072584     0330

LIFT #           SAMPLED FROM           RDWY           STATION
  ..             STOCKPILE.....         ..           .....

P/E CODE           RDWY           STATION OR PIT #
  .                ..             .....

LOG           REMARKS           CORRECTION           QUIT
  
```

SCREEN IMAGE 3.20

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.4 ---- FINE SIEVES CONTINUED

Having chosen "FINE SIEVES CONTINUED" from the previous menu, the computer will now print a screen image containing statements for which you are to respond with the correct information.

This option on the menu is for retrieving tests from the holding file. We will assume that in example #1 the user picked "LOG" after entering the coarse screens and is now ready to continue with the fine screens.

EXAMPLE #4 EXAMPLE #4 EXAMPLE #4 EXAMPLE #4

The first screen will prompt you as shown in SCREEN IMAGE 3.21 for information needed to identify which test is wanted, at which point the program brings the test into memory. If for any reason the user changes his mind about entering the fine sieve information and intends to do so later, he should re-log the test to the holding file, otherwise, that test will be lost.

Keying in the requested information in SCREEN IMAGE 3.21 will then take you to SCREEN IMAGE 3.22.

```

-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
PROJECT CODE          PROJECT NUMBER          PROJECT NAME
  1112                IXF-084-(0)          ***** TEST PROJECT *****

CONTINUATION

MATERIAL CODE   EN                               <==== B
TYPE CODE   ..                               <==== C
SPEC #    1                               <==== D
TOTAL DRY WT. OF SPLIT SAMPLE  539..          <==== E
SIZE   .                               <==== F
TEST #  1...                               <==== G
SUFFIX  ..                               <==== H
-----
                SCREEN IMAGE    3.21
-----

```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.4 ---- FINE SIEVES CONTINUED

Keying in the data as shown in SCREEN IMAGE 3.22, you will proceed to SCREEN IMAGE 3.23 showing INPUT data and all CALCULATED data to complete fine sieve analysis. The user may then either quit or continue with the logging portion as explained in example #1.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112	PROJECT NUMBER IXF-084-(0)	PROJECT NAME ***** TEST PROJECT *****
----------------------	-------------------------------	--

SIEVE	WEIGHT	RET.	
#8	102.		<==== P
#10	84..		<==== Q
#16	76..		<==== R
#30	68..		<==== S
#40	54..		<==== T
#50	41..		<==== U
#100	12..		<==== V
#200	44..		<==== W
-#200	1..		<==== X

SCREEN IMAGE 3.22

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112	PROJECT NUMBER IXF-084-(0)	PROJECT NAME ***** TEST PROJECT *****
----------------------	-------------------------------	--

SIEVE	WEIGHT	% RET.	% PASS.	SPECIFICATION	N TEST AVG.
#8	102	8	35		
#10	84	7	28		
#16	76	6	22		
#30	68	5	17		
#40	54	4	13		
#50	41	3	10		
#100	12	1	9	X	
#200	44	4		X	
-#200	1		4.6		
TOTAL =	482				
ELUT =	57				

LOG QUIT

SCREEN IMAGE 3.23

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.1 -- SOILS AND AGGREGATE GRADATION
SECTION 1.5 ---- LIST HOLDING FILE

This option is available to enable the user to determine what tests are waiting in the holding file to be completed. It merely lists all tests and then gives you the option to return to the previous menu by entering "C" or in some cases a need to delete the record by keying a "D". Screen image 3.25 illustrates this option.

ADOT MATERIALS PROGRAM

SAMPLE TEST LISTING

PROJECT MATERIALS TEST LISTING FOR 03-20-86

REC #	PROJ. CODE	MATERIAL CODE	PUR	TYPE CODE	SIZE	SPEC #	TEST #	DATE SAMPLE
1	1112	EM	I			1	1	072184

CONTINUE

DELETE

SCREEN IMAGE 3.25

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS
SECTION 1.0 ---- OPTIONS

Having chosen "COMPACTION TESTS" from your previous menu, shown in SCREEN IMAGE 3.25, you have a NEW MENU with OPTIONS displayed in SCREEN IMAGE 3.26.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

LABRATORY CALCULATION ROUTINES

(3.1.1) SOILS AND AGGREGATE GRADATIONS

* (3.1.2) COMPACTION TESTS *

(3.1.3) ASPHALTIC CONCRETE TESTS

(3.1.4) COMPOSITE GRADATIONS

(3.1.5) SPECIFICATION TRANSACTIONS (gradations)

RETURN

SCREEN IMAGE 3.25

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS
SECTION 1.0 ---- OPTIONS

EXAMPLE:

Choosing "LABORATORY PROCTOR TEST" you will go to Chapter 3.1.2,
Section 1.1 for the first prompting screen.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

COMPACTION TESTS

* (3.1.2-1.1) - LABORATORY PROCTOR TEST *

(3.1.2-1.2) - FIELD COMPACTION CHECK USING VOLUMETER METHOD

(3.1.2-1.3) - FIELD COMPACTION CHECK USING SAND CONE METHOD

(3.1.2-1.4) - COMPUTE FIVE POINT PROCTOR

(3.1.2-1.5) - PROCTOR DESIGN FILE TRANSACTIONS

- RETURN

OR AND THEN ENTER

SCREEN IMAGE 3.26

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS
SECTION 1.1 ---- LABORATORY PROCTOR TESTS

All proctors using methods (A,C,& D) will be stored in a file exclusively attached to a specific project. This makes them totally unique within that project. Louisiana Family of Curves (LFC) developed proctors reside in a COMMON FILE and can be used with any project.

This example is EXAMPLE #5 listed in the appendix.

EXAMPLE #5 EXAMPLE #5 EXAMPLE #5 EXAMPLE #5

The first screen will prompt you as shown in SCREEN IMAGE 3.27
Keying in the responses as requested will take you to the next screen shown in SCREEN IMAGE 3.28 which is the normal TABULATION LOGGING screen.

```
-----  
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM  
  
PROJECT CODE      PROJECT NUMBER      PROJECT NAME  
  1112            IXF-084-(0)          ***** TEST PROJECT *****  
  
                ROUTINE TO LOG PROCTORS  
  
ENTER MATERIAL CODE   SB  
ENTER TYPE CODE ( IF APP.) ..  
ENTER PROCTOR NUMBER  2...  
ENTER SPECIFICATION #  1  
ENTER PERCENT COMPACTION SPECIFICATION (###)  95.  
ENTER METHOD USED (A,C,D, or LFC)  A..  
  
                PROCTOR TEST VALUES  
  
ENTER O.D. SP. GR. (#.###)  2.51  
ENTER PERCENT ABSORPTION (##.##)  1.53  
ENTER PERCENT ROCK (##.##)  3.0  
ENTER OPTIMUM MOISTURE (##.##)  14.6  
ENTER MAXIMUM DRY DENSITY (###.##)  113.4  
  
                CONTINUE                  REENTER                  QUIT
```

```
-----  
                SCREEN IMAGE    3.27  
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS
SECTION 1.1 ---- LABORATORY PROCTOR TESTS

After choosing to log Proctor, program will return to THE "COMPACTION TESTS MENU" for further instructions. This proctor will be used in any compaction tests that calls for it. The TEST # (2), in this example will be the PROCTOR SPEC # to be used when a compaction test is entered against the proctor.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

PROJ. CODE	MATL	TYPE	PUR	LAB	SPEC #	SIZE	SIZE %
1112	SB	..	P	P	1	.	A.

TEST #	SUFFIX	SAMPLED BY	DATE	TIME
2...	.	RD & AS.	080484	0915

LIFT #	SAMPLED FROM	RDWY	STATION
..	WB WINGWALL	WB	229+10.

P/E CODE	RDWY	STATION OR PIT #
.	WB	229+10.

LOG	REMARKS	CORRECTION	QUIT
-----	---------	------------	------

SCREEN IMAGE 3.28

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.2 ---- FIELD COMPACTION CHECK (USING VOLUMETER METHOD)

Having chosen "FIELD COMPACTION TESTS-VOLUMETER" from your last menu, the computer will now proceed with prompting statements for which you are to respond with the correct information. The ... at the end of a request releases the keyboard for your response.

This example is EXAMPLE #6 listed in the appendix.

EXAMPLE #6 EXAMPLE #6 EXAMPLE #6 EXAMPLE #6

The first screen will prompt you as shown in SCREEN IMAGE 3.29
Keying in the responses as requested will take you to the next screen
shown in SCREEN IMAGE 3.30.

```
-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
  1112                IXF-084-(0)          ***** TEST PROJECT *****

                COMPACTION TESTS
                FIELD COMPACTION CHECK (USING VOLUMETER METHOD)

ENTER MATERIAL CODE  SB
ENTER TYPE CODE (IF APP.) ..
ENTER PROCTOR NUMBER 2
ENTER SPECIFICATION # 1
ENTER METHOD USED     A..

-----
                        SCREEN IMAGE    3.29
-----
```

```
-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
  1112                IXF-084-(0)          ***** TEST PROJECT *****

                COMPACTION TESTS
                FIELD COMPACTION CHECK (USING VOLUMETER METHOD)

                        VALUES FOR PROCTOR

                PROCTOR WAS RUN AS A METHOD A

                OPTIMUM MOISTURE = 14.6
                MAXIMUM DENSITY = 113.4
                PERCENT ABSORPTION = 1.53
                SP.GR. RET. #4 = 2.51

                ARE THESE VALUES CORRECT?  Y=YES  N=NO

-----
                        SCREEN IMAGE    3.30
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.2 ---- FIELD COMPACTION CHECK (USING VOLUMETER METHOD)

Assuming our values are correct in SCREEN 3.30, we enter a "Y", and continue to SCREEN 3.31 which will prompt you for the information required. Completing the last entry, the next image is SCREEN 3.32 showing calculated results.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE PROJECT NUMBER PROJECT NAME
1112 IXF-084-(0) ***** TEST PROJECT *****

COMPACTION TESTS
FIELD COMPACTION CHECK (USING VOLUMETER METHOD)

FIELD TEST DATA

ENTER TOTAL SAMPLE WT. (A) 10.11
ENTER WT. MATERIAL RET. #4 SIEVE (B) 2.50
ENTER PERCENT MOISTURE (D) 8.9
ENTER FINAL READING (F) .096
ENTER BEGINNING READING (G) .011

SCREEN IMAGE 3.31

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE PROJECT NUMBER PROJECT NAME
1112 IXF-084-(0) ***** TEST PROJECT *****

COMPACTION TESTS
FIELD COMPACTION CHECK (USING VOLUMETER METHOD)

COMPACTION CHECK

PERCENT ROCK = 24.7
VOLUME = .085
WET DENSITY = 118.9
DRY DENSITY = 111.2
PERCENT COMP. = 92.5 %

WARNING: PERCENT COMPACTION IS NOT IN COMPLIANCE

LOG RECHECK NEW TEST QUIT

SCREEN IMAGE 3.32

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.2 ---- FIELD COMPACTION CHECK USING VOLUMETER METHOD

After choosing to log COMPACTION TEST, the program will prompt you for SAMPLE TABULATION information as shown in SCREEN 3.33.

NOTE: Be sure to complete SPEC # which is the same as the PROCTOR TEST # when the proctor was logged into the "DAILY MATERIAL FILE".

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

PROJ. CODE	MATL	TYPE	PUR	LAB	SPEC #	SIZE	SIZE %
1112	SB	..	V	P	1	.	A.

TEST #	SUFFIX	SAMPLED BY	DATE	TIME
16..	.	COTTOLN.	080484	0915

LIFT #	SAMPLED FROM	RDWY	STATION
1.	BOT RET WALL BK.....	EB	229+25.

P/E CODE	RDWY	STATION OR PIT #
E	FR	229+25.

LOG	REMARKS	CORRECTION	QUIT
-----	---------	------------	------

SCREEN IMAGE 3.33

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.3 ---- FIELD COMPACTION CHECK USING SAND CONE METHOD

Having chosen "FIELD COMPACTION TESTS-SAND CONE" from your last menu, the computer will now proceed with prompting statements for which you are to respond with the correct information. The _ or ... at the end of a request releases the keyboard for your response.

This example is EXAMPLE #7 listed in the appendix.

EXAMPLE #7 EXAMPLE #7 EXAMPLE #7 EXAMPLE #7

The first screen will prompt you as shown in SCREEN IMAGE 3.35
Keying in the responses as requested will take you to the next screen
shown in SCREEN IMAGE 3.36

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

COMPACTION TESTS
FIELD COMPACTION CHECK (USING SANDCONE METHOD)

ENTER MATERIAL CODE EM
ENTER TYPE CODE (IF APP.) ..
ENTER PROCTOR NUMBER 1
ENTER SPECIFICATION # 1
ENTER METHOD USED A..

SCREEN IMAGE 3.35

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

COMPACTION TESTS
FIELD COMPACTION CHECK USING SANDCONE METHOD
VALUES FOR PROCTOR

PROCTOR WAS RUN AS A METHOD A

OPTIMUM MOISTURE = 10
MAXIMUM DENSITY = 124
PERCENT ABSORPTION = 1
SP.GR. RET. #4 = 2.61

ARE THESE VALUES CORRECT? 1=YES 2=NO

SCREEN IMAGE 3.36

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.3 ---- FIELD COMPACTION CHECK USING SAND CONE METHOD

After confirming the original proctor values shown in SCREEN IMAGE 3.36, the program will prompt you for the field test data as demonstrated in SCREEN IMAGE 3.37. Supplying the information requested, the next SCREEN IMAGE 3.38 will reflect all calculations. If you choose to log, the typical tabulation data will be requested represented by SCREEN IMAGE 3.39.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

FIELD TEST DATA

ENTER TOTAL SAMPLE WT. (A) 11.08
 ENTER WT. MATERIAL RET. #4 SIEVE (B) 3.77
 ENTER PERCENT MOISTURE (D) 8.7
 ENTER WEIGHT OF SAND & CONTAINER BEFORE FILLING HOLE (F) 15.16
 ENTER WEIGHT OF SAND & CONTAINER AFTER FILLING HOLE (G) 4.75
 ENTER WEIGHT OF SAND TO FILL CONE (I) 3.55
 ENTER DENSITY OF SAND (K) 83.8

SCREEN IMAGE 3.37

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

COMPACTION TESTS
 FIELD COMPACTION CHECK (USING SANDCONE METHOD)

COMPACTION CHECK

PERCENT ROCK = 34.0
 VOLUME = .082
 WET DENSITY = 135.4
 DRY DENSITY = 127.6
 PERCENT COMP. = 96.9 %

LOG	RECHECK	NEW TEST	QUIT
-----	---------	----------	------

SCREEN IMAGE 3.38

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.3 ---- FIELD COMPACTION CHECK USING SAND CONE METHOD

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

MATERIAL LOGGING ROUTINE

PROJ. CODE	MATL	TYPE	PUR	LAB	SPEC #	SIZE	METHOD
1112	EM	..	S	P	1	.	A.

TEST #	SUFFIX	SAMPLED BY	DATE	TIME
4...	.	KIRTOW..	061984	0715

LIFT #	SAMPLED FROM	RDWY	STATION
..	RAMP D 25' LT.....	EB	778+80.

P/E CODE	RDWY	STATION pr PIT #
E	EB	781+00.

LOG	REMARKS	CORRECTION	QUIT

SCREEN IMAGE 3.39

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS
SECTION 1.4 ---- COMPUTE FIVE POINT PROCTOR

Having chosen "COMPUTE FIVE POINT PROCTOR" from your previous menu, the computer will now proceed with prompting statements for which you are to respond with the correct information. The at the end of a request releases the keyboard for your response.

This example is EXAMPLE #5 listed in the appendix.

EXAMPLE #5 EXAMPLE #5 EXAMPLE #5 EXAMPLE #5

The first screen will prompt you as shown in SCREEN IMAGE 3.40. Keying in the responses as requested will take you to the next SCREEN IMAGE 3.41 showing the calculated information.

```
-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
   1112                IXF-084-(0)          ***** TEST PROJECT *****

        THIS PROGRAM CALCULATES AN OPTIMUM MOISTURE CONTENT
        AND SOIL DENSITY GIVEN FOUR SETS OF PROCTOR DATA

FOR TEST NO. 1 ENTER MOISTURE CONTENT, SOIL DENSITY   14.4      113.6
FOR TEST NO. 2 ENTER MOISTURE CONTENT, SOIL DENSITY   12.4      110.5
FOR TEST NO. 3 ENTER MOISTURE CONTENT, SOIL DENSITY   15.0      113.0
FOR TEST NO. 4 ENTER MOISTURE CONTENT, SOIL DENSITY   16.8      110.0
-----
                        SCREEN IMAGE      3.40
-----
```

```
-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
   1112                IXF-084-(0)          ***** TEST PROJECT *****

POLYNOMIAL EQUATION:

Y =  0.000(X 3) + -0.026(X 2) +  9.735(X) + 20.741

WHERE X = MOISTURE CONTENT
WHERE Y = SOIL DENSITY

OPTIMUM MOISTURE CONTENT = 14.6
        SOIL DENSITY = 113.4

                        LOG                QUIT
-----
                        SCREEN IMAGE      3.41
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.5 ---- PROCTOR DESIGN FILE TRANSACTIONS

Having chosen "PROCTOR DESIGN FILE TRANSACTIONS" from your previous menu, SCREEN IMAGE 3.43 appears and requests the PROCTOR METHOD USED (A,C,D, or LFC). All proctors, other than LFC reside in a file exclusively attached to a specific project. This makes them totally unique within that project. Louisiana Family of Curves (LFC) developed proctors reside in a COMMON FILE and can be used with any project as needed.

After replying to the prompt, SCREEN IMAGE 3.45 will be displayed.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

ENTER METHOD USED A..

SCREEN IMAGE 3.43

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.2 -- COMPACTION TESTS

SECTION 1.5 ---- PROCTOR DESIGN FILE TRANSACTIONS

SCREEN IMAGE 3.45 displays all proctors associated specifically with the project. The proctors were written to this file at the same time they were written to the WEEKLY MATERIALS LOG as a TEST#.

That proctor TEST# is now defined as the PROC # associated within any unique combination of MAT CODE & TYPE CODE. This file is searched when any compaction tests are run.

The purpose of this procedure is to let you examine what is in the file and to be able to delete a PROCTOR RECORD when it is no longer needed.

If you key a "D", another prompting statement shown by line index (Z =====>) will appear. Keying the REC # associated with the proper PROC # will delete that proctor.

Pressing any other key during display of the proctor records will send you back to the previous menu.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112					PROJECT NUMBER IXF-084-(0)			PROJECT NAME ***** TEST PROJECT *****			
REC #	MAT CODE	TYPE CODE	PROC #	M	O.D. SP.G	%ABS	%RET #4	OPT HOI	MAX D -4	CORR DEN	COMP SPEC
1	SB		1	A	2.51	1.53	2.0	14.6	113.4	113.4	95
2	EM		1	A	2.38	1.15	22.2	13.8	115.4	119.9	95

D=DELETE RECORD PRESS ANY OTHER KEY TO RETURN

Z =====> ENTER RECORD NO. TO BE DELETED

SCREEN IMAGE 3.45

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.0 ---- OPTIONS

Having chosen "ASPHALTIC CONCRETE TESTS" from your previous menu, shown in SCREEN IMAGE 3.46, you have a NEW MENU with OPTIONS displayed in SCREEN IMAGE 3.47, asking for the type code of the asphaltic concrete you will be processing.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

MATERIAL CALCULATION ROUTINES

(3.1.1) SOILS AND AGGREGATE GRADATIONS

(3.1.2) COMPACTION TESTS

* (3.1.3) ASPHALTIC CONCRETE TESTS *

(3.1.4) COMPOSITE GRADATIONS

(3.1.5) SPECIFICATION TRANSACTIONS

RETURN

SCREEN IMAGE 3.46

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.0 ---- OPTIONS

By selecting "3/4 Inch Mix", your next menu exhibited in SCREEN IMAGE 3.48 will show the various options available. Choosing "EXTRACTIONS" you will go to Chapter 3.1.3, Section 1.1 for first prompting screen.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE

SELECT TYPE CODE

* - 3/4 Inch Mix *

3/8 Inch Mix

1/2 Inch Mix

USE OR AND THEN ENTER

SCREEN IMAGE 3.47

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

ASPHALTIC CONCRETE

OPTIONS

* (3.1.3-1.1) - EXTRACTIONS *

(3.1.3-1.2) - A.C. GRADATIONS

(3.1.3-1.3) - VOIDS CALCULATIONS

(3.1.3-1.4) - BULK SP. GR. OF COMPACTED BITUMINOUS MIXTURES

(3.1.3-1.5) - LOCATIONS or COMPLIANCE OF AC LOTS

(3.1.3-1.6) - RANDOM TONNAGE FOR MA ACCEPTANCE

(3.1.3-1.7) - A.C. MIX DESIGN FILE TRANSACTIONS

(3.1.3-1.8) - HOLDING FILE TRANSACTIONS

USE OR AND THEN ENTER

SCREEN IMAGE 3.48

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.1 ---- EXTRACTIONS

Having chosen "EXTRACTIONS" from your previous menu, the computer will now proceed with prompting statements for which you are to respond with the correct information. The dots at the end of a request or prompt releases the keyboard for your response.

This example is EXAMPLE #8 listed in the appendix.

EXAMPLE #8 EXAMPLE #8 EXAMPLE #8 EXAMPLE #8

The first screen will prompt you as shown in SCREEN IMAGE 3.49.
Keying in the responses as requested will take you to the next screen shown in SCREEN IMAGE 3.50.

```
-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
    1112                IXF-084-(0)          ***** TEST PROJECT *****

                ASPHALTIC CONCRETE

ENTER MIX DESIGN NUMBER TO BE USED   1          <===== SPEC #
ENTER PURPOSE      A                  <===== DEFAULT PURPOSE

-----
                SCREEN IMAGE      3.49
-----
```

```
-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
    1112                IXF-084-(0)          ***** TEST PROJECT *****

                ASPHALTIC CONCRETE

ENTER WT. CELITE, FILTER & -#200'S (a)   178
ENTER WT. CELITE & FILTER                  (B)   115
ENTER DRY WT. OF EXTRACTED AGGREGATE (d)  2446
ENTER TRAP READING (f)  0.5
ENTER WT. OF MOISTURE SAMPLE              (g)   500
ENTER INITIAL WT. OF A.C. SAMPLE (i)     2640

THEN USING THESE VALUES, PERCENT ASPHALT = 4.97 %      3 TEST AVG =4.95 %

RECHECK      GRADATIONS      VOIDS      CORES      LOG      QUIT
-----
                SCREEN IMAGE      3.50
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.1 ---- EXTRACTIONS

Let us now choose to go on to "AC GRADATION" with this sample by keying in a "G" at the bottom of SCREEN IMAGE 3.50. This will take you to SCREEN IMAGE 3.51 requesting two pieces of information. Completing the entry, SCREEN IMAGE 3.52 will ask you for verification of calculated data. Keying a "G" will then move you to SCREEN IMAGE 3.53 prompting you for weights retained on all sieves.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

ASPHALTIC CONCRETE

ASPHALTIC CONCRETE GRADATIONS

ENTER O.D. SPLIT OF WT. OF -#4 (q) 728
ENTER DRY WT. PASSING #4 (r) 1414

SCREEN IMAGE 3.51

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE GRADATIONS

CORRECTED -#4 WT. = 1477
CORRECTED TOTAL WT. = 2509
CORRECTED DRY WT. OF PASSING #4 SPLIT = 760

CONTINUE RECHECK VOIDS RETURN

SCREEN IMAGE 3.52

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.1 ---- EXTRACTIONS

Upon completing the entry of coarse screen information as shown in SCREEN IMAGE 3.53, the program will make the calculations as displayed in SCREEN IMAGE 3.54. By keying a "C", the program will move to SCREEN IMAGE 3.50 requesting fine sieves input data.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE GRADATIONS

Sieve	Weight
1 1/2"
1"
3/4"	221.
1/2"	307.
3/8"	201.
1/4"	198.
#4	105.
-#4	1477

SCREEN IMAGE 3.53

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE GRADATIONS

SIEVE	WEIGHT	% RET.	% PASS.	SPECIFICATION	3 TEST AVG.
1 1/2"	0	0	100		
1"	0	0	100		
3/4"	221	9	91		
1/2"	307	12	79		
3/8"	201	8	71		
1/4"	198	8	63		
#4	105	4			
-#4	1477		59	(58.9)	
TOTAL =	2509				

CONTINUE	REENTER	VOIDS	LOG	QUIT
----------	---------	-------	-----	------

SCREEN IMAGE 3.54

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.1 ---- EXTRACTIONS

Keying in the retained weights on the fine sieves as exhibited in SCREEN IMAGE 3.55 the next SCREEN IMAGE 3.56 will appear showing calculated data. Choosing to go on to "VOIDS ANALYSIS", you would key in a "V" to move to SCREEN IMAGE 3.57

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

ASPHALTIC CONCRETE GRADATIONS

SIEVE	WEIGHT
#8	117
#10	...
#16	...
#30	...
#40	418
#50	...
#100	...
#200	177
-#200	...

SCREEN IMAGE 3.55

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.1 ---- EXTRACTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE GRADATIONS

SIEVE	WEIGHT	% RET.	% PASS.	SPECIFICATIONS	3 TEST AVG.
#8	117	9	50		
#10	0	0	50		
#16	0	0	50		
#30	0	0	50		
#40	418	32	18		
#50	0	0	18		
#100	0	0	18		
#200	177	14			
-#200	0		3.7		
TOTAL =	712				
ELUT =	48				

REENTER	VOIDS	LOG	QUIT
---------	-------	-----	------

SCREEN IMAGE 3.56

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.1 ---- EXTRACTIONS

SCREEN IMAGE 3.57 contains a bounce bar menu that asks if you are going to use the design specific gravity or if you want the program to calculate a new one. We have chosen to use the design specific gravity. After entering the AC Mix Dry Bulk Specific Gravity, the calculations are then exhibited in SCREEN IMAGE 3.58. If, after examining the data, you opt for a recheck, SCREEN IMAGE 3.57 will reappear. Upon completion of 3.58 SCREEN, we will now log the entire sample containing 'EXTRACTION', 'GRADATION', & 'VOIDS ANALYSIS', by entering an "L" and bringing up SCREEN IMAGE 3.59 which is the typical TABULATION SCREEN.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

VOIDS ANALYSIS

CALCULATE VOIDS USING: *****
*- DESIGN COMBINED SP. GR. *

- CAL. COMBINED SP. GR.

ENTER AC Mix Dry Bulk Sp. Gr. (Gmb) 2.286
ENTER Corrected Marshall Stability _
ENTER Marshall Flow Reading _

SCREEN IMAGE 3.57

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

VOIDS ANALYSIS

Combined Sp.Gr. Used = 2.566

Voids in Mineral Agg. = 15.6	3 TEST AVG. = 15.5
Effective Voids = 5.7	5.7
Voids Filled = 63.4	63.3
Calculated Rice Test = 2.286	
Sample Maximun Density = 142.4	
AC Mix Bulk Density = 142.4	142.4

GRADATIONS	RECHECK	LOG	QUIT
------------	---------	-----	------

SCREEN IMAGE 3.58

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.1 ---- EXTRACTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112		PROJECT NUMBER IXF-084-(0)				PROJECT NAME ***** TEST PROJECT *****	
PROJ. CODE 1112	MATL AC	TYPE 34	PUR A	LAB P	SPEC # 1	SIZE .	SIZE % ..
TEST # 14..	SUFFIX .	SAMPLED BY LAGUNA..		DATE 072683		TIME 1125	
LIFT # 2.	SAMPLED FROM LEFT TURN BAY.....				RDWY EB	STATION 102+85.	
P/E CODE P	RDWY ..		STATION or PIT # COLUMB.				
LOG	REMARKS	HOLD	CORRECTION			QUIT	

SCREEN IMAGE 3.59

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.2 ---- A.C. GRADATIONS

Having chosen "AC GRADATIONS" from your previous menu, the computer will now proceed with prompting statements for which you are to respond with the correct information. The ? or... at the end of a request releases the keyboard for your response.

This example is EXAMPLE #8 listed in the appendix.

EXAMPLE #8 EXAMPLE #8 EXAMPLE #8 EXAMPLE #8

The first screen will prompt you as shown in SCREEN IMAGE 3.60 . Keying in the necessary extract on data as required, SCREEN IMAGE 3.61 will appear showing corrected weights of sample for gradation.

From this point the program will repeat itself as explained in Chapter 3.1.3, Section 1.1 starting with SCREEN IMAGE 3.53 .

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE

ASPHALTIC CONCRETE GRADATIONS

ENTER O.D. SPLIT WT. OF -#4 (q) 728
ENTER DRY WT. PASSING#4 (r) 1414
ENTER WT. OF -#200'S (c) 63
ENTER DRY WT. OF EXTRACTED AGGREGATE (d) 2446

SCREEN IMAGE 3.60

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE GRADATIONS

CORRECTED -#4 WT. = 1477
CORRECTED TOTAL WT. = 2509
CORRECTED DRY WT. OF PASSING #4 SPLIT = 760

CONTINUE	RECHECK	VOIDS	QUIT
----------	---------	-------	------

SCREEN IMAGE 3.61

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.3 ---- VOIDS CALCULATIONS

Having chosen "VOIDS CALCULATIONS" from your previous menu, the program will now proceed with prompting statements for which you are to respond with the correct information. The ? OR ... at the end of a request releases the keyboard for your response.

This example is EXAMPLE #8 listed in the appendix.

EXAMPLE #8 EXAMPLE #8 EXAMPLE #8 EXAMPLE #8

The first screen will prompt you as shown in SCREEN IMAGE 3.65 for the Mix Design Number and will move to SCREEN IMAGE 3.66 for specific information as exhibited.

From this point the program will repeat itself as explained in Chapter 3.1.3, Section 1.1 starting with SCREEN IMAGE 3.58 .

```
-----  
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM  
  
PROJECT CODE          PROJECT NUMBER          PROJECT NAME  
  1112                IXF-084-(0)            ***** TEST PROJECT *****  
  
                ASPHALTIC CONCRETE  
  
ENTER MIX DESIGN NUMBER TO BE USED  1  
  
-----  
                        SCREEN IMAGE    3.65  
-----
```

```
-----  
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM  
  
PROJECT CODE          PROJECT NUMBER          PROJECT NAME  
  1112                IXF-084-(0)            ***** TEST PROJECT *****  
  
                        VOIDS ANALYSIS  
                        *****  
CALCULATE VOIDS USING:  *- DESIGN COMBINED SP. GR. *  
                        *****  
                        - CAL. COMBINED SP. GR.  
  
ENTER AC Mix Dry Bulk Sp. Gr. (Gmb)  2.286  
ENTER Percent Passing #4 (Pf)  59  
ENTER Percent Asphalt (p)  4.97  
ENTER Corrected Marshall Stability  _  
ENTER Marshall Flow Reading  _  
  
-----  
                        SCREEN IMAGE    3.66  
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS

SECTION 1.4 ---- BULK SP. GR. OF COMPACTED BITUMINOUS MIXTURES

Having chosen "BULK SP. GR. OF COMPACTED BITUMINOUS MIXTURES" from the previous menu, the program will now print a screen image of the form on the back of the asphalt concrete workcard. Fill in the blanks as needed. If the stability and flow are not to be calculated then do not fill in the line labeled SPECIMEN HEIGHTS and the program will skip those calculations. Specimen Heights should be between 1.9 inches and 3 inches, otherwise, a message is printed stating you are out of range. This message also appears if the Stability Table is missing. When all three columns have been filled in, averages will be calculated and printed on the screen. If you go on to VOIDS these will be kept in memory and saved to the test record.

This example is EXAMPLE #8 listed in the appendix.

EXAMPLE #8 EXAMPLE #8 EXAMPLE #8 EXAMPLE #8

```

-----
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE          PROJECT NUMBER          PROJECT NAME
1112                  IXF-084-(0)              ***** TEST PROJECT *****

                BULK SPECIFIC GRAVITY OF COMPACTED BITUMINOUS MIXTURES

SPECIMEN HEIGHTS          2.693.  2.699.  2.703

A  mass of sample in air   1163.8  1165.9  1164.8
B  mass of SSD sample in air 1164.6  1165.7  1165.7
C  mass of sample in water  651.2.  658.7.  657.4.
Bulk Specific Gravity      2.267.  2.3...  2.292.      Average = 2.286
Marshall Stability Reading  4450..  4600..  4140..
Corrected Marshall Stability 3960..  4048..  3643..      Average = 3884.
Marshall Flow Reading      8.....  8.....  8.....      Average = 8....

                VOIDS                REENTER                QUIT

-----
                SCREEN IMAGE      3.68
-----

```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.5 ---- LOCATIONS OR COMPLIANCE OF AC LOTS

Having chosen "LOCATIONS OR COMPLIANCE OF AC LOTS" from your previous menu, the Bounce Bar Menu as shown in SCREEN IMAGE 3.70 requests you to choose one of the selections. By selecting "RANDOM LOCATIONS", the program will exhibit SCREEN IMAGE 3.71.

***** RANDOM LOCATIONS OF AC LOTS *****

This procedure is primarily used to prepare RANDOM LOCATIONS for AC ACCEPTANCE samples as well as save the information for future recording of the NUCULAR DENSITY data.

This example is EXAMPLE #9 listed in the appendix.

EXAMPLE #9 EXAMPLE #9 EXAMPLE #9 EXAMPLE #9

The second screen will prompt you as shown in SCREEN IMAGE 3.71 for information to allow the program to calculate test locations and other data. This data is then printed to allow Eng. Technicians a field work sheet showing test locations for NUCULAR DENSITIES. This work sheet is reproduced as part of EXAMPLE 9.

***** ADOT ASPHALTIC CONCRETE LOT ACCEPTANCE UTILITY PROGRAM *****

PROJECT # = IXF-084-1(0)
RE/SUPERVISOR = HR T

NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION

ASPHALT CONCRETE LOT ACCEPTANCE

* RANDOM LOCATIONS FOR LOT ACCEPTANCE *

CALCULATION CHECK and LOGGING OF LOT ACCEPTANCE

LIST LOT ACCEPTANCE RECORDS

RETURN

SCREEN IMAGE 3.70

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.5 ---- LOCATIONS OR COMPLIANCE OF AC LOTS

***** RANDOM LOCATIONS OF AC LOTS *****

As displayed in SCREEN IMAGE 3.71, the program will prompt you for specific items. Lot #, NO of AREAS, AVE. H/DEN, DSGN #, and AC correction factor must be completed to insure proper calculations. Considering the data to be correct and keying a "C", SCREEN IMAGE 3.72 prompts you for additional data associated with location, width, thickness and direction/distance to Construction Center Line. The screen also prompts you for a "Status of Edge" as indicated by indexes X =====> and Y =====>. Upon keying a 'U' or 'C' for the left edge, line X is replaced by line Y. Keying an "L", the program will log all data and print random location report.

***** ADOT ASPHALTIC CONCRETE LOT ACCEPTANCE UTILITY PROGRAM *****

PROJECT # = IXF-084(0)
RE/SUPERVISOR = MR T

NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION

RANDOM LOCATIONS FOR AC LOT ACCEPTANCE

PROJ. CODE 1112	MATERIAL CODE AC	TYPE CODE 34	PURPOSE CODE A	LAB CODE P	
LOT # 3..	SUFFIX ..	NO. AREAS 1	DATE (MMDDYY) 080184	TIME (HH.MM) 17.29	TESTED BY DWP.....
SOURCE AGG #1	SOURCE AGG #2	SOURCE ASPH.	AVE H/DEN 144.1	DSGN # 1	CORRECTION FACTOR 2.9..

CONTINUE

REENTER

QUIT

SCREEN IMAGE 3.71

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.5 ---- LOCATIONS OR COMPLIANCE OF AC LOTS

***** RANDOM LOCATIONS OF AC LOTS *****

***** ADOT ASPHALTIC CONCRETE LOT ACCEPTANCE UTILITY PROGRAM *****

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

SECTIONS COVERED BY LOT # 3

SEC #	LIFT #	RDWY	B/STATION (#####.##)	E/STATION (#####.##)	HAT WIDTH	HAT DEPTH	DIR	DISTANCE C/L to C/L
1	1	EB	95.50...	107.50..	10..	3...	LT	16..

X =====> STATUS OF LT. EDGE-- U=UNCONFINED C=CONFINED
Y =====> STATUS OF RT. EDGE-- U=UNCONFINED C=CONFINED

CONTINUE REENTER QUIT

SCREEN IMAGE 3.72

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.5 ---- LOCATIONS OR COMPLIANCE OF AC LOTS

***** COMPLIANCE OF AC LOTS *****

Selecting "CALCULATION CHECK and LOGGING of LOT ACCEPTANCE", the program first requests the LOT #, SUFFIX and METHOD used. Lot # & Suffix are the same you established in "RANDOM LOCATION of AC LOTS". The Method selections are (1=Back Scatter Count), (2=Wet Densities), & (3=Cores). For this example we will use WET DENSITIES. If a "RANDOM LOCATION of AC LOTS" was not previously entered, the program will allow you to advance no farther. Entering the data, SCREEN IMAGE 3.73 appears and begins prompting you for data primarily associated with the NUCULAR GAUGE. You may change any data as the CURSOR moves through each data item field. Upon entering "C" (continue), SCREEN IMAGE 3.74 is exhibited.

***** ADOT ASPHALTIC CONCRETE LOT ACCEPTANCE UTILITY PROGRAM *****

PROJECT # = IXF-084-1(0)
RE/SUPERVISOR = MR T

NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION

ASPHALTIC CONCRETE LOT COMPLIANCE

GAUGE	DAILY			
S/NUMBER	STANDARD	CORRECTION	AVE	TESTED
7079	COUNT	FACTOR	H/DEN	BY
	2826	2.9..	144.1	DWP

CONTINUE

REENTER

QUIT

SCREEN IMAGE 3.73

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.5 ---- LOCATIONS OR COMPLIANCE OF AC LOTS

***** COMPLIANCE OF AC LOTS *****

SCREEN IMAGE 3.74 begins prompting you as you move the CURSOR through the data fields. Much of the data is provided from the record made when random locations were run. Here again, you may change any of the data as the CURSOR addresses each field. Skipping a TEST # is accomplished by pressing enter key with no entry made in first field (W/DENSITY READINGS). A message is displayed at that time to insure this is what you wish to do. Upon completing last entry, PERCENT OF COMPLIANCE FOR LOT is calculated and PRINTED. Choosing to log test, as shown by Line Index X =====>, the record will be logged and Line Index Y =====> will prompt you as displayed (SCREEN or PRINTER). If you choose to PRINT, the report as exhibited in SCREEN IMAGE 3.75 will be sent to the printer.

**** ADOT ASPHALTIC CONCRETE LOT ACCEPTANCE UTILITY PROGRAM ****

PROJECT # = IXF-084-1(0)
RE/SUPERVISOR = MR T

NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION

ASPHALTIC CONCRETE LOT COMPLIANCE

LOT #	1	SUFFIX =		TEST VALUES FOR SECTION # 2				
TEST #	STATION	OFFSET	(W/DENSITY READINGS)		C/DEN.	M/DEN.	% COMP.	
1	97+69..	-12.1.	138.6	137.0	140.1	144.1	97.6	
2	98+59..	-10.6.	134.9	134.2	137.5	144.1	95.4	
3	100+38.	-17.5.	134.8	135.0	137.8	144.1	95.6	
4	103+82.	-11.3.	137.6	137.6	140.5	144.1	97.5	
5	104+81.	-11.2.	
VALUE WAS SKIPPED			CONTINUE		REENTER			
6	104+85.	-14.7.	134.3	131.6	135.9	144.1	94.3	
7	105+35.	-14.3.	138.0	134.7	139.3	144.1	96.7	
8	106+13.	-16.8.	137.0	135.7	139.3	144.1	96.7	

THE PERCENT OF COMPLIANCE FOR THIS LOT IS 86 %

LOT IS WITHIN SPECIFICATION FOR % COMPLIANCE

X =====> LOG	REMARKS	PRINT	CHECK	QUIT
Y =====>	SCREEN	PRINTER		

SCREEN IMAGE 3.74

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.5 ---- LOCATIONS OR COMPLIANCE OF AC LOTS

***** COMPLIANCE OF AC LOTS *****

ASPHALTIC CONCRETE LOT ACCEPTANCE

PROJECT # IXF-084-(0)
RE/SUPERVISOR: MR T

NAME = ***** TEST PROJECT *****
CONTRACTOR: LIGHTING CONSTRUCTION

LOT # = 1 DATE = 071684 TIME = 12:59 GAUGE NO = 7079

TEST RESULTS FOR SECTION # 1

TEST #	STATION	OFFSET	F/DENSITY	COR/DENSITY	MAX/DENSITY	% COMP.
1	97+69	-12.1	137.8	140.7	144.1	97.6
2	98+59	-10.6	134.6	137.5	144.1	95.4
3	100+38	-17.5	134.9	137.8	144.1	95.6
4	103+82	-11.3	137.6	140.5	144.1	97.5
6	104+85	-14.7	136.4	139.3	144.1	96.7
7	105+35	-14.3	136.4	139.3	144.1	96.7
8	106+13	-16.8	132.9	135.9	144.1	94.3

BEGINNING STA. = 95+50

ENDING STA. = 075+50

AREA IN SECTION = 1333 SQ. YD.

APX. TONNAGE = 216 TONS

MAT WIDTH = 10.0 FT

MAT DEPTH = 3.00 INCHES

PLACED IN EB RDWAY, 1 st. LIFT, C/L OF MAT IS 16.0 FT. LT. OF RDWAY C/L

APX. TONS OF A.C. REPRESENTED BY THIS LOT IS 216.15 TONS

% COMPLIANCE = 86 AVE. % COMPACTION = 96.3 S/DEV. = 1.21

LOT IS IN SPECIFICATION FOR PERCENT COMPLIANCE

TESTED BY _____ PROJECT LABMAN _____ RE/SUP. _____

RECEIVED BY _____ DATE _____

SCREEN IMAGE 3.75

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.6 ---- RANDOM TONNAGE FOR HA ACCEPTANCE

Having chosen "RANDOM TONNAGE FOR HA ACCEPTANCE" from the previous menu, SCREEN IMAGE 3.80 requests one item of information to RANDOMIZE TONNAGE selections. EXAMPLE #12 is a sample of the PRINTOUT you would receive by simply pressing the ENTER KEY and letting the program default to 7 numbers ranging from 1 to 3500 tons (within 500 ton lots).

This example is EXAMPLE #12 listed in the appendix.

EXAMPLE #12 EXAMPLE #12 EXAMPLE #12 EXAMPLE #12

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM.

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ASPHALTIC CONCRETE

RANDOM TONNAGE NUMBERS FOR HA ACCEPTANCE

ENTER APX. TONS FOR DAY'S PRODUCTION (DEFAULT = 7 NUMBERS)?

SCREEN IMAGE 3.80

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.7 ---- A.C. MIX DESIGN TRANSACTIONS

Having chosen "A.C. MIX DESIGN TRANSACTIONS" from your previous menu, SCREEN IMAGE 3.81 presents you with another menu having two choices. Let us first look at "CREATE AC MIX DESIGN RECORD", causing SCREEN IMAGE 3.82 to appear.

***** PROJECT MIX DESIGN FILE TRANSACTIONS *****

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

* - CREATE AC MIX DESIGN RECORD *

- LIST DESIGN DATA

- RETURN

USE OR AND THEN ENTER

SCREEN IMAGE 3.81

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.7 ---- A.C. MIX DESIGN TRANSACTIONS

Selecting "CREATE MIX DESIGN RECORD", SCREEN IMAGE 3.82 requests the required data the program needs to make a permanent record of a specific MIX DESIGN. This information will be retrieved each time an asphalt test is entered into the machine. Upon completing the last data item entry, SCREEN IMAGE 3.83 will display the DESIGN VALUES and requests your verification as to their accuracy. Keying an 'L' will LOG the MIX DESIGN. You may review all the MIX DESIGNS by selecting "LIST DESIGN DATA" from previous menu. This example is EXAMPLE #8 listed in appendix A.

EXAMPLE #8 EXAMPI : #8 EXAMPLE #8 EXAMPLE #8

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER MIX DESIGN NUMBER ? 1

DATA INPUT ROUTINE (TO SKIP A VALUE, PRESS <enter>)
 ENTER PERCENT ABORBED ASPHALT (Pba) ? .58
 ENTER DESIGN SP.GR. OF ASPHALT (Gb) ? 1.0208
 ENTER COARSE AGG. SP. GR. (Gc) ? 2.554
 ENTER FINE AGG. SP. GR. (Gf) ? 2.574
 ENTER TYPE OF ADHIXTURE (1=Lime,2=Cement,3=1P Cement) ? 2
 ENTER PERCENT OF ADHIXTURE (Pad) ? 2.0
 ENTER COMB. AGG. BULK O.D. SP.GR. (Gsb) ? 2.566
 ENTER MAX THEORETICAL DENSITY ? 151.0
 ENTER PROJECT DETERMINED RENTENTION FACTOR (O) ? .12

SCREEN IMAGE 3.82

DESIGN VALUES ENTERED

ABSORBED ASPHALT = .58
 SP.GR. OF ASPHALT = 1.0208
 SP.GR. OF C/AGG = 2.554
 SP.GR. OF F/AGG = 2.574
 TYPE OF M/ADHIX = CEMENT
 % OF MINERAL ADHIX = 2
 COMBINED SP.GR. = 2.566
 MAX THEORETICAL DENSITY = 151
 PROJ. RET/FACTOR = .12

LOG REENTER QUIT

SCREEN IMAGE 3.83

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.7 ---- A.C. MIX DESIGN TRANSACTIONS

Having chosen "LIST DESIGN DATA" from previous menu, SCREEN IMAGE 3.84 appears and displays all PROJECT MIX DESIGNS that have been entered into the file.

The purpose of this procedure is to let you examine what is in the file and to be able to delete a MIX DESIGN when it is no longer needed.

If you key a "D", another prompting statement shown by line index (Z =====>) will appear. Keying the REC # associated with the proper DES # will delete that MIX DESIGN.

Pressing ENTER key during display of either of the prompting statements will send you back to the previous menu.

***** PROJECT MIX DESIGN FILE TRANSACTIONS *****											
PROJECT CODE 1112			PROJECT NUMBER IXF-084-(0)				PROJECT NAME ***** TEST PROJECT *****				
REC #	DES #	TY	%ABS ASPH	ASPH	SPECIFIC GRAVITY		COMB	%	ADM TYPE	MAX T DEN	RET FAC
					CA	FA					
1	3	12	.58	1.031	2.562	2.584	2.576	2	2	153.4	.12
2	1	38	.54	1.021	2.554	2.574	2.566	2	2	152.7	.12
3	2	34	.76	1.041	2.564	2.557	2.578	2	2	151	.12

D=DELETE A RECORD PRESS ANY OTHER KEY TO RETURN

Z =====> ENTER RECORD NO. TO BE DELETED

SCREEN IMAGE 3.84

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.8 ---- HOLDING FILE TRANSACTIONS

The Holding File stores tests that are partially completed. The program assumes that Extractions will be done first; therefore, once this part of the test is entered, the user may at any time, select "LOG" and move to the logging screen where the "HOLD" option may be selected placing the test in the Holding File. He may at any time thereafter select "HOLDING FILE TRANSACTIONS" on the menu and recover that test by first, selecting the next portion of the test to be completed, COARSE SEIVES, FINE SEIVES, or VOIDS, and then completing the information requested in SCREEN IMAGE 3.85 to identify which test is wanted. The program will then bring into memory that test, if found, and delete it from the holding file. The user is then free to complete as many parts of the test as are available and then either store it back into the holding file or log the test to the Daily File. If for any reason after calling up a test from the holding file the user should change his mind about entering data he should be sure and save it, either back to the holding file or log it, otherwise, it will be lost.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****
MATERIAL CODE AC		
TYPE CODE 34		
SPEC # .		
SIZE .		
TEST #		
SUFFIX ..		

SCREEN IMAGE 3.85

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.3 -- ASPHALTIC CONCRETE TESTS
SECTION 1.8 ---- HOLDING FILE TRANSACTIONS

The list option of HOLDING FILE TRANSACTIONS lists all tests in the holding file and gives the status of each. The status is indicated under the column headed PARTS COMPLETED. If a part of the test has been completed the program will indicate this by listing the first letter of the part completed. An "E" means extractions have been entered. A "C" means Coarse Sieves have been entered. An "F" means Fine Sieves have been entered and a "V" means Voids have been completed.

ADOT MATERIALS PROGRAM

SAMPLE TEST LISTING

PROJECT MATERIAL TEST SUMMARY FOR 03-31-1986

REC #	MATERIAL CODE	PUR	TYPE CODE	SIZE CODE	SPEC #	TEST #	PARTS COMPLETED
1	AC	A	34		1	1	E C

CONTINUE

DELETE

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS
SECTION 1.0 ---- OPTIONS

Having chosen " COMPOSITE GRADATIONS " from previous menu shown in SCREEN IMAGE 3.87 , you have a NEW MENU with OPTIONS displayed in SCREEN IMAGE 3.88 . Let us choose "COMPUTE COMPOSITE KEYING PERCENTS RETAINED" and move to SCREEN IMAGE 3.89 . Both procedures using either PERCENTS RETAINED or PERCENTS PASSING are totally alike after initial input. I would suggest using PERCENTS RETAINED when possible as it is much easier to address those sieves desired than to key in EVERY SIEVE down to 0 % passing in the PERCENTS PASSING input mode. Each BIN gradation addresses sieves from 3" to -200.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

MATERIAL CALCULATION ROUTINES

(3.1.1) SOILS AND AGGREGATE GRADATIONS
(3.1.2) COMPACTION TESTS
(3.1.3) ASPHALTIC CONCRETE TESTS

* (3.1.4) COMPOSITE GRADATIONS *

(3.1.5) SPECIFICATION TRANSACTIONS
RETURN

SCREEN IMAGE 3.87

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.1 ---- COMPUTE COMPOSITE KEYING PERCENTS RETAINED

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

COMPOSITE PROGRAM OPTIONS

* (3.1.4-1.1) - COMPUTE COMPOSITE KEYING PERCENTS RETAINED *

(3.1.4-1.2) - COMPUTE COMPOSITE KEYING PERCENTS PASSING
(3.1.4-1.3) - COMPUTE COMPOSITE KEYING WEIGHTS RETAINED
(3.1.4-1.4) - COMPUTE COMPOSITE KEYING WEIGHTS PASSING
(3.1.4-1.5) - COMPUTE COMPOSITE USING STORED TESTS
(3.1.4-1.6) - JNFIT PROGRAM
- RETURN

SCREEN IMAGE 3.88

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPUTE A COMPOSITE GRADATION

SECTION 1.1 ---- COMPUTE COMPOSITE KEYING PERCENTS RETAINED

SCREEN IMAGE 3.89 prompts you for MATERIAL CODE, TYPE, SPEC #, NO. of BINS and PERCENT ADMIX. Responding with the entries as exhibited, SCREEN IMAGE 3.90 will further prompt you. After entering BIN #1 % and the percents retained for each sieve, the program will ask you if the values are correct "C" or reenter "R". Choosing an "R" will cause the program to start over with this screen. Choosing a "C", the program will continue to BIN #2 and prompt you for the same sieve numbers % retained. I am only going to show you BIN #1 input screen. After completing BIN #2,3,&4 input, SCREEN IMAGE 3.91 will appear with a recap of all information keyed and the composite sieves % RET and % PASS. "P" will send the screen to your printer. "B" will bring up a new screen for you to reassign BIN PERCENTAGES and recalculate. "J" will give you the opportunity to execute a BIN OPTIMIZER procedure named JINFIT. This procedure is explained in SECTION 1.6.

NOTE: A MAXIMUM OF 5 BINS MAY BE USED.

This example is EXAMPLE #18 listed in the appendix, and is taken from ADOT MATERIALS TESTING MANUAL / COMPOSITE GRADING, FIGURE 2

EXAMPLE #18 EXAMPLE #18 EXAMPLE #18 EXAMPLE #18

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER MATERIAL CODE AB
ENTER TYPE CODE ..
ENTER SPEC # 1
ENTER NUMBER OF BINS BEING USED 4
IF APP., ENTER % CEMENT OR LIME BEING USED ..

SCREEN IMAGE 3.89

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.1 ----- COMPUTE COMPOSITE USING PERCENTS RETAINED

NOTE: Each sieve will require you to either enter the data or
if no data to PRESS ENTER KEY to advance to next sieve.
This is required for every sieve from the #3" to the
-#200.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

ENTER PERCENT BEING USED FROM BIN # 1 23
FOR BIN # 1 , ENTER THE PERCENTS RETAINED

3"
2 1/2"
2"
1 1/2"
1"
3/4"
1/2" 55
3/8" 40
1/4" 4
#4 1
#8
#10
#16
#30
#40
#50
#100
#200
-#200

CONTINUE

REENTER

SCREEN IMAGE 3.90

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.1 ---- COMPUTE COMPOSITE KEYING PERCENTS RETAINED

COMPOSITE GRADATION									
PROPORTIONS =	23	20	27	30	0	ADMIX	COMPOSITE		JMF
							% RET	% PASS	
3/4"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
1/2"	55.5	0.0	0.0	0.0	0.0	0.0	12.6	87.0	
3/8"	40.0	10.0	0.0	0.0	0.0	0.0	11.2	76.0	
1/4"	4.0	48.0	1.0	0.0	0.0	0.0	10.8	65.0	
#4	1.0	27.0	9.0	0.0	0.0	0.0	8.0	57.0	
#8	0.0	12.0	30.0	4.0	0.0	0.0	11.7	45.0	
#10	0.0	1.0	10.0	1.0	0.0	0.0	3.2	42.0	
#16	0.0	1.0	19.0	6.0	0.0	0.0	7.1	35.0	
#30	0.0	0.0	12.0	17.0	0.0	0.0	8.3	27.0	
#40	0.0	0.0	3.0	18.0	0.0	0.0	6.2	21.0	
#50	0.0	0.0	3.0	21.0	0.0	0.0	7.1	14.0	
#100	0.0	0.0	4.0	23.0	0.0	0.0	8.0	6.0	
#200	0.0	0.0	2.0	7.0	0.0	0.0	2.6	3.1	
-#200	0.0	0.8	6.9	3.3	0.0	0.0	3.1	0.0	
LOG	PRINT		BIN %		JMF		QUIT		

SCREEN IMAGE						3.91			

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPUTE A COMPOSITE GRADATION
SECTION 1.2 ---- COMPUTE COMPOSITE KEYING PERCENTS PASSING

SCREEN IMAGE 3.92 prompts you for MATERIAL CODE, TYPE, SPEC #, NO. of BINS and PERCENT ADMIX. Responding with the entries as exhibited, SCREEN IMAGE 3.93 will further prompt you. After entering BIN #1 % and the percents passing for each sieve, the program will ask you if the values are correct "C" or reenter "R". Choosing an "R" will cause the program to start over with this screen. Choosing a "C", the program will continue to BIN #2 and prompt you for the same sieve numbers % passing. I am only going to show you BIN #1 input screen. After completing BIN #2,3,&4 input, SCREEN IMAGE 3.94 will appear with a recap of all information keyed and the composite sieves % RET and % PASS. "P" will send the screen to your printer. "B" will bring up a new screen for you to reassign BIN PERCENTAGES and recalculate. "J" will give you the opportunity to execute a BIN OPTIMIZER procedure named JIMFIT. This procedure is explained in SECTION 1.6.

NOTE: A MAXIMUM OF 5 BINS MAY BE USED.

This example is EXAMPLE #19 listed in the appendix, and is taken from ADOT MATERIALS TESTING MANUAL / COMPOSITE GRADING, FIGURE 3

EXAMPLE #19 EXAMPLE #19 EXAMPLE #19 EXAMPLE #19

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER MATERIAL CODE AB
ENTER TYPE CODE ..
ENTER SPEC # 1
ENTER NUMBER OF BINS BEING USED 4
IF APP., ENTER % CEMENT OR LIME BEING USED ..

SCREEN IMAGE 3.92

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS
SECTION 1.2 ---- COMPUTE COMPOSITE KEYING PERCENTS PASSING

NOTE: Each sieve will require you to enter 100 down to the first sieve for which there is data. All sieves have to be addressed. If there is no data, the previous sieve value must be keyed down to a sieve for which data values are known. If all percentages have been covered and additional sieves are to be addressed, simply press enter key for all remaining sieves.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER PERCENT BEING USED FROM BIN # 1 23
FOR BIN # 1 , ENTER THE PERCENTS PASSING

3"	100
2 1/2"	100
2"	100
1 1/2"	100
1"	100
3/4"	100
1/2"	45
3/8"	5
1/4"	1
#4	
#8	
#10	
#16	
#30	
#40	
#50	
#100	
#200	
-#200	

CONTINUE REENTER

SCREEN IMAGE 3.93

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.2 ---- COMPUTE COMPOSITE KEYING PERCENTS PASSING

COMPOSITE GRADATION									
PROPORTIONS =	23	20	27	30	0	ADMIX	COMPOSITE		JMF
							% RET	% PASS	
3/4"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
1/2"	55.5	0.0	0.0	0.0	0.0	0.0	12.6	87.0	
3/8"	40.0	10.0	0.0	0.0	0.0	0.0	11.2	76.0	
1/4"	4.0	48.0	1.0	0.0	0.0	0.0	10.8	65.0	
#4	1.0	27.0	9.0	0.0	0.0	0.0	8.0	57.0	
#8	0.0	12.0	30.0	4.0	0.0	0.0	11.7	45.0	
#10	0.0	1.0	10.0	1.0	0.0	0.0	3.2	42.0	
#16	0.0	1.0	19.0	6.0	0.0	0.0	7.1	35.0	
#30	0.0	0.0	12.0	17.0	0.0	0.0	8.3	27.0	
#40	0.0	0.0	3.0	18.0	0.0	0.0	6.2	21.0	
#50	0.0	0.0	3.0	21.0	0.0	0.0	7.1	14.0	
#100	0.0	0.0	4.0	23.0	0.0	0.0	8.0	6.0	
#200	0.0	0.0	2.0	7.0	0.0	0.0	2.6	3.1	
-#200	0.0	0.8	6.9	3.3	0.0	0.0	3.1	0.0	
LOG	PRINT		BIN %		JMF		QUIT		

SCREEN IMAGE						3.94			

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPUTE A COMPOSITE GRADATION

SECTION 1.3 ---- COMPUTE COMPOSITE KEYING WEIGHTS RETAINED

SCREEN IMAGE 3.95 prompts you for MATERIAL CODE, TYPE, SPEC #, NO. of BINS and PERCENT ADMIX. Responding with the entries as exhibited, SCREEN IMAGE 3.96 will further prompt you for total sample weight and percent used from Bin # 1. The screen will clear these two items and prompt you for each sieve weight. Upon completion of entering the weights retained for each sieve, the program will ask you if the values are correct "C" or reenter "R". Choosing an "R" will cause the program to start over with this screen. Choosing a "C", the program will then prompt you for the SPLIT SAMPLE WEIGHT, and continue with prompts starting with the #8 screen. If there is no fine screens to consider, press ENTER KEY and the program will continue to BIN #2 and prompt you for the same information as before. I am only going to show you BIN # 1 input screens.

After completing BIN #2,3,&4 input, SCREEN IMAGE 3.97 will appear with a recap of sieve percents retained and the composite sieves % RET and % PASS. "P" will send the screen to your printer. "B" will bring up a new screen for you to reassign BIN PERCENTAGES and recalculate. "J" will give you the opportunity to execute a BIN OPTIMIZER procedure named JIMFIT. This procedure is explained in SECTION 1.6.

NOTE: A MAXIMUM OF 5 BINS MAY BE USED.

This example is EXAMPLE #18 listed in the appendix, and is taken from ADOT MATERIALS TESTING MANUAL / COMPOSITE GRADING, FIGURE 1 & 2

EXAMPLE #18

EXAMPLE #18

EXAMPLE #18

EXAMPLE #18

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

ENTER MATERIAL CODE AB
ENTER TYPE CODE ..
ENTER SPEC # 1
ENTER NUMBER OF BINS BEING USED 4
IF APP., ENTER % CEMENT OR LIME BEING USED ..

SCREEN IMAGE 3.95

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.3 ----- COMPUTE COMPOSITE KEYING WEIGHTS RETAINED

NOTE: Each sieve will require you to either enter the data or
if no data to PRESS ENTER KEY to advance to next sieve.
This is required for every sieve from the #3" to the
-#200.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

ENTER TOTAL SAMPLE WEIGHT FROM BIN # 1 6649.
ENTER PERCENT BEING USED FROM BIN # 1 23

COARSE SIEVES

SIEVE	WEIGHT
3"
2 1/2"
2"
1 1/2"
1"
3/4"
1/2"	3636
3/8"	2660
1/4"	302.
#4	19..
-#4	32..

CONTINUE

REENTER

SCREEN IMAGE 3.96

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.3 ---- COMPUTE COMPOSITE KEYING WEIGHTS RETAINED

COMPOSITE GRADATION									
PROPORTIONS =	23	20	27	30	0	ADMIX	COMPOSITE		JMF
							% RET	% PASS	
3/4"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
1/2"	55.5	0.0	0.0	0.0	0.0	0.0	12.6	87.0	
3/8"	40.0	9.0	0.0	0.0	0.0	0.0	11.0	76.0	
1/4"	5.0	49.0	1.0	0.0	0.0	0.0	11.3	65.0	
#4	1.0	27.0	10.0	0.0	0.0	0.0	8.1	57.0	
#8	0.0	12.0	30.0	4.0	0.0	0.0	11.2	46.0	
#10	0.0	1.0	10.0	2.0	0.0	0.0	3.5	42.0	
#16	0.0	1.0	19.0	6.0	0.0	0.0	7.1	35.0	
#30	0.0	0.0	12.0	17.0	0.0	0.0	8.3	27.0	
#40	0.0	0.0	3.0	18.0	0.0	0.0	6.2	21.0	
#50	0.0	0.0	3.0	21.0	0.0	0.0	7.1	14.0	
#100	0.0	0.0	4.0	23.0	0.0	0.0	8.0	6.0	
#200	0.0	0.0	3.0	6.0	0.0	0.0	2.6	3.0	
-#200	0.0	0.8	6.9	3.3	0.0	0.0	3.0	0.0	
LOG	PRINT		BIN %		JMF		QUIT		

SCREEN IMAGE						3.97			

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPUTE A COMPOSITE GRADATION
SECTION 1.4 ---- COMPUTE COMPOSITE KEYING WEIGHTS PASSING

Keying weights passing is actually keying weights retained on each sieve, but using the weights passing to calculate the composite. This will give you a slightly different result because of rounding and correcting to 100%. The screens will be identical to those described in SECTION 1.3 .

SCREEN IMAGE 3.98 prompts you for MATERIAL CODE, TYPE, SPEC #, NO. of BINS and PERCENT ADMIX. Responding with the entries as exhibited, SCREEN IMAGE 3.99 will further prompt you for total sample weight and percent used from Bin # 1. The screen will clear these two items and prompt you for each sieve weight. Upon completion of entering the weights retained for each sieve, the program will ask you if the values are correct "C" or reenter "R". Choosing an "R" will cause the program to start over with this screen. Choosing a "C", the program will then prompt you for the SPLIT SAMPLE WEIGHT, and continue with prompts starting with the #8 screen. If there is no fine screens to consider, press ENTER KEY and the program will continue to BIN #2 and prompt you for the same information as before. I am only going to show you BIN # 1 input screens. After completing BIN #2,3,&4 input, SCREEN IMAGE 4.00 will appear with a recap of sieve percents retained and the composite sieves % RET and % PASS. "P" will send the screen to your printer. "B" will bring up a new screen for you to reassign BIN PERCENTAGES and recalculate. "J" will give you the opportunity to execute a BIN OPTIMIZER procedure named JINFIT. This procedure is explained in SECTION 1.6.

NOTE: A MAXIMUM OF 5 BINS MAY BE USED.

This example is EXAMPLE #19 listed in the appendix, and is taken from ADOT MATERIALS TESTING MANUAL / COMPOSITE GRADING, FIGURE 1 & 3

EXAMPLE #19 EXAMPLE #19 EXAMPLE #19 EXAMPLE #19

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER MATERIAL CODE	AB
ENTER TYPE CODE	..
ENTER SPEC #	1
ENTER NUMBER OF BINS BEING USED	4
IF APP., ENTER % CEMENT OR LIME BEING USED	..

SCREEN IMAGE 3.98

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS
SECTION 1.3 ---- COMPUTE COMPOSITE USING WEIGHTS PASSING

NOTE: Each sieve will require you to either enter the data or
if no data to PRESS ENTER KEY to advance to next sieve.
This is required for every sieve from the #3" to the
-#200.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ENTER TOTAL SAMPLE WEIGHT FROM BIN # 1 6649.
ENTER PERCENT BEING USED FROM BIN # 1 23

COARSE SIEVES

SIEVE	WEIGHT
3"
2 1/2"
2"
1 1/2"
1"
3/4"
1/2"	3636
3/8"	2660
1/4"	302.
#4	19..
-#4	32..

CONTINUE REENTER

SCREEN IMAGE 3.99

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.4 ---- COMPUTE COMPOSITE KEYING WEIGHTS PASSING

COMPOSITE GRADATION								
PROPORTIONS =	23	20	27	30	0	ADMIX	COMPOSITE	JMF
3/4"	100.0	100.0	100.0	100.0	0.0	0.0	100.0	
1/2"	45.0	100.0	100.0	100.0	0.0	0.0	87.3	
3/8"	5.0	90.0	100.0	100.0	0.0	0.0	76.2	
1/4"	0.0	42.0	99.0	100.0	0.0	0.0	65.1	
#4	0.0	15.0	89.0	100.0	0.0	0.0	57.0	
#8	0.0	3.0	61.0	96.0	0.0	0.0	45.9	
#10	0.0	2.0	51.0	94.0	0.0	0.0	42.4	
#16	0.0	1.0	32.0	88.0	0.0	0.0	35.2	
#30	0.0	1.0	20.0	71.0	0.0	0.0	26.9	
#40	0.0	1.0	17.0	53.0	0.0	0.0	20.7	
#50	0.0	1.0	14.0	32.0	0.0	0.0	13.6	
#100	0.0	1.0	10.0	9.0	0.0	0.0	5.6	
#200	0.0	0.8	6.8	3.3	0.0	0.0	3.0	
LOG	PRINT		BIN %		JMF		QUIT	
SCREEN IMAGE 4.00								

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPUTE A COMPOSITE GRADATION
SECTION 1.5 ---- COMPUTE COMPOSITE USING STORED TESTS

This procedure allows you to extract previous stored gradation tests by TEST# and assign each one a BIN NO and PERCENTAGE. The program will then calculate and display the composite. SCREEN IMAGE 4.01, as shown, prompts you for the number of BINS you wish. The screen will clear and then prompt you for the information as shown. Completing the prompts, the same calculated composite screen as shown in the previous examples of composites will be shown.

Consider our four gradations in EXAMPLE #18 and #19 associated with FIG #1, #2, and #3 in the ADOT TESTING MANUAL / COMPOSITE GRADING, are previously stored TEST #'s 64, 65, 66, & 67. Entering as shown in SCREEN IMAGE 4.01, the composite is displayed in SCREEN IMAGE 4.02.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

COMPOSITE USING STORED TESTS

ENTER NUMBER OF BINS BEING USED 4

BIN #	% OF COMP	MATERIAL TYPE	TYPE CODE	SPEC #	SIZE CODE	TEST #	SUFFIX
1	23	AB	64..	..
2	20	AB	65..	..
3	27	AB	66..	..
4	30	AB	67..	..

SCREEN IMAGE 4.01

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.5 ---- COMPUTE COMPOSITE USING STORED TESTS

Two things you will notice about SCREEN IMAGE 4.02. One is that the #10 sieve is the same as the #16 sieve. This is because the #10 sieve is the only sieve for which no data is kept within any stored gradation. If this sieve is necessary, then the composite will have to be determined by any one of the other methods previously presented. The second item is that you have another choice of TEST at the bottom of the screen. If you key "T" the program will allow you to reassign another stored TEST # to any one of your BINS.

COMPOSITE GRADATION								
PROPORTIONS =	23	20	27	30	0	ADMIX	COMPOSITE	JMF
3/4"	100.0	100.0	100.0	100.0	0.0	0.0	100.0	
1/2"	45.0	100.0	100.0	100.0	0.0	0.0	87.3	
3/8"	5.0	90.0	100.0	100.0	0.0	0.0	76.3	
1/4"	0.0	42.0	99.0	100.0	0.0	0.0	65.1	
#4	0.0	15.0	89.0	100.0	0.0	0.0	57.0	
#8	0.0	3.0	61.0	96.0	0.0	0.0	45.9	
#10	0.0	1.0	32.0	88.0	0.0	0.0	35.2	
#16	0.0	1.0	32.0	88.0	0.0	0.0	35.2	
#30	0.0	1.0	20.0	71.0	0.0	0.0	26.9	
#40	0.0	1.0	17.0	53.0	0.0	0.0	20.7	
#50	0.0	1.0	14.0	32.0	0.0	0.0	13.6	
#100	0.0	1.0	10.0	9.0	0.0	0.0	5.6	
#200	0.0	0.8	6.8	3.3	0.0	0.0	3.0	
LOG	PRINT	BIN %			JMF	TEST	QUIT	

SCREEN IMAGE					4.02			

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPOSITE GRADATIONS

SECTION 1.5 ---- COMPUTE COMPOSITE USING STORED TESTS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM														
PROJECT CODE				PROJECT NUMBER						PROJECT NAME				
1112				IXF-084-(0)						***** TEST PROJECT *****				
15 COMPOSITES WHICH BEST MATCH THE JMF TARGET VALUES														
3/4 IN	3/8 IN	#8	#40	#200	*BIN/STOCKPILE	PERCENT	*	%	*WEIGHTED*					
100.0	75.0	45.0	20.0	3.0	*	1	2	3	4	5	*ADMIX*	DEV.	*	

100.0	74.4	44.7	20.3	2.8	*	25	20	25	30	0	*	0.0	*	0.52
100.0	78.8	44.8	20.4	2.9	*	20	25	25	30	0	*	0.0	*	0.77
100.0	74.9	45.8	19.4	3.3	*	25	15	35	25	0	*	0.0	*	0.98
100.0	70.2	44.5	20.3	2.8	*	30	15	25	30	0	*	0.0	*	1.02
100.0	83.1	44.9	20.5	2.9	*	15	30	25	30	0	*	0.0	*	1.12
100.0	70.6	45.7	19.3	3.3	*	30	10	35	25	0	*	0.0	*	1.34
100.0	79.2	46.0	19.4	3.4	*	20	20	35	25	0	*	0.0	*	1.47
100.0	65.8	44.3	20.3	2.8	*	35	10	25	30	0	*	0.0	*	1.53
100.0	87.3	45.1	20.5	3.0	*	10	35	25	30	0	*	0.0	*	1.55
100.0	74.4	42.9	18.5	3.0	*	25	20	30	25	0	*	0.0	*	1.65
100.0	66.3	45.5	19.3	3.2	*	35	5	35	25	0	*	0.0	*	1.69
100.0	74.9	47.5	21.1	3.1	*	25	15	30	30	0	*	0.0	*	1.75
100.0	78.8	43.0	18.6	3.1	*	20	25	30	25	0	*	0.0	*	1.92
100.0	83.5	46.1	19.5	3.4	*	15	25	35	25	0	*	0.0	*	1.97
100.0	74.0	43.5	21.3	2.4	*	25	25	15	35	0	*	0.0	*	2.00

PRINT

CONTINUE

SCREEN IMAGE 4.04

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.4 -- COMPUTE A COMPOSITE GRADATION
SECTION 1.6 ---- JMFIT PROGRAM

The JMFIT PROGRAM is an optimizing program for bin composites. This will calculate the FIFTEEN best solutions in 5% increment adjustments to the bin composite. This is achieved by inputting the desired TARGET VALUE of Percent Passing on each of FIVE (5) different sieves. The design sieves are the 3/4, 3/8, #8, #40, & #200. Considering we use the example in the last section of using stored tests and creating a composite as shown in SCREEN IMAGE 4.02, keying a "J" will bring up SCREEN IMAGE 4.03 prompting you for the target values. Upon entering the values as shown, the program will begin its calculations.

NOTE. This will take the computer 5 to 10 minutes to execute.

After completing the calculations, SCREEN IMAGE 4.04 will be displayed showing the 15 best solutions.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****
THE JMF TARGET VALUE FOR THE 3/4" SIEVE = 100		
THE JMF TARGET VALUE FOR THE 3/8" SIEVE = 75		
THE JMF TARGET VALUE FOR THE #8 SIEVE = 45		
THE JMF TARGET VALUE FOR THE #40 SIEVE = 20		
THE JMF TARGET VALUE FOR THE #200 SIEVE = 3		

SCREEN IMAGE 4.03

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.5 -- SPECIFICATION TRANSACTION (gradations)
SECTION 1.0 ---- OPTIONS

Having chosen "SPECIFICATION TRANSACTIONS" from your previous menu, you have a new menu with options as shown in SCREEN IMAGE 4.07.

The purpose of these SPECS are for you to be able to write a gradation specification for each pairing of "MATERIAL CODE", "TYPE CODE", and "SPEC #". This will allow you to put your material specs in for the project only once and any need for that information will be available to the MATERIAL SAMPLE TESTS as they are logged. Whatever SIEVE NOS., FINENESS MODULUS, SAND EQUIVALENT, or PI you choose will control the printing of the spec columns in the WEEKLY REPORTS. If a Spec Range is not desired in REPORT LEADING, but you would like to view certain items, place any character, such as a 'X' in the field you wish to see displayed on screen or in the printed reports.

By using only three data items, you can control any gradation spec required. This means for example, if there are two distinct materials that have the same "MATERIAL CODE" and "TYPE CODE", they will have a DIFFERENT SPEC # when logged. The SPEC # may be 0-9 or A-Z.

If we choose "ENTER NEW SPEC", SCREEN IMAGE 4.08 appears and prompts you as shown.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

SPECIFICATIONS MENU

ENTER NEW SPECIFICATION

EDIT AN EXISTING SPECIFICATION

DELETE AN EXISTING SPECIFICATION

RETURN

SCREEN IMAGE 4.07

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.5 -- SPECIFICATION TRANSACTIONS (gradations)
SECTION 1.0 ---- OPTIONS

Looking at SCREEN IMAGE 4.08, prompts you for the SIEVES, FM, PI, SE, and AVE for which you can select any combination of data items. To pass over a sieve, press enter key and move to the next. In this example which is EXAMPLE #3 in the appendix, the first spec entered is 100 (100%) passing the 3/8" sieve. The #4 sieve is the next spec desired and a range of 94-100 is keyed as shown. After completing the screen and you wish to change something, you may key in an R and the CURSOR will go back through the screen as you press enter. If you wish to remove an entry item from one of the fields, place the cursor in the first character position within that field and strike the BACKSLASH key (left of the Z) and the entry will be removed. When every item is the way you want, key an L and the spec will be logged.

The field labeled AVE is used if you would like a running test average. In this example a 3 has been used. This means that after every third test an average will be computed and printed on your report.

Upon completion of logging, the program takes you back to the previous menu. If you wish to look at the entire SPEC FILE, select "EDIT EXISTING RECORDS" and SCREEN IMAGE 4.09 will appear.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

MATERIAL SPECIFICATIONS ENTRY

MATERIAL CODE	FA	TYPE CODE	GR	SPEC #	1
3"	3/4"	#8	#40
2 1/2"	1/2"	#10	#50 0-30..
2"	3/8"	100...	#16	45-80.	#100 0-10..
1 1/2"	1/4"	#30	#200
1"	#4	94-100	FM 0 ..	PI 0	SE 0 AVE 3

LOG REENTER QUIT

SCREEN IMAGE 4.08

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 3.1.5 -- SPECIFICATION TRANSACTIONS (gradations)
SECTION 1.0 ---- OPTIONS

***** EDIT EXISTING RECORDS *****

Selecting "EDIT EXISTING RECORDS" from previous menu, SCREEN IMAGE 4.09 appears with a listing of REC #'s associated with 6 data items of the SPEC NUMBER. If you want to see all SPEC ITEMS of a particular SPEC, key in the REC # and SCREEN IMAGE 4.08 will re-appear for your inspection or to change a spec item. Pressing Q will take you back to the previous menu.

*: ***** DELETE SPECIFICATION RECORD *****

Selecting "DELETE SPECIFICATION RECORD", SCREEN IMAGE 4.09 will appear, with a different prompting statement as indicated by line index X =====>. Keying in the REC # will delete the SPEC from the file. Keying a Q will negate any action and move you to previous menu.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112		PROJECT NUMBER IXF-084-(0)		PROJECT NAME ***** TEST PROJECT *****			
REC #	MATERIAL	TYPE	SPEC #	FH	PI	SE	AVE
1	MA	57	5	2.59	17	87	
2	MA	57	1	2.59	16	87	
3	FA	GR	1	0	0	0	3

ENTER NO. OF RECORD TO BE EDITED OR PRESS ENTER

X =====> ENTER NO. OF RECORD TO BE DELETED OR PRESS ENTER

SCREEN IMAGE 4.09

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.0 -- CONCRETE UTILITY PROGRAM
SECTION 1.0 ---- OPTIONS

Having chosen "EXECUTE CONCRETE UTILITY PROGRAM" from previous menu shown in SCREEN IMAGE 4.1 , you have a NEW MENU with OPTIONS displayed in SCREEN IMAGE 4.2 . Let us choose "CREATE MIX DESIGN DATA RECORD" and move to SCREEN IMAGE 4.3 which will require input as displayed. This example is EXAMPLE #15 listed in the appendix.

EXAMPLE #15 EXAMPLE #15 EXAMPLE #15 EXAMPLE #15

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ROUTINES

(3.1.0)	MATERIALS CALCULATION ROUTINES

* (4.1.0)	EXECUTE CONCRETE UTILITY PROGRAM *

(5.1.0)	PRINT/EDIT REPORTS
(7.1.0)	MISCELLANEOUS TEST CALCULATIONS
(8.1.0)	STATISTICAL ANALYSIS ROUTINES
(9.1.0)	PROJECT ID FILE TRANSACTIONS
(10.1.0)	END OR CHANGE PROJECTS

USE OR AND THEN ENTER

SCREEN IMAGE 4.1

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.0 -- CONCRETE UTILITY PROGRAM
SECTION 1.0 ---- OPTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

OPTIONS

* (4.1.0-1.1) - CREATE MIX DESIGN DATA RECORD *

(4.1.0-1.2) - DISPLAY A MIX DESIGN
(4.1.0-1.3) - CONCRETE MIX DESIGN TRANSACTIONS
(4.1.0-1.4) - ADJUST A MIX DESIGN
(4.1.1-1.0) - CONCRETE CYLINDER LOGS
- RETURN

USE OR TO SELECT <== TO EXECUTE

SCREEN IMAGE 4.2

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.0 -- CONCRETE UTILITY PROGRAM
SECTION 1.1 ---- CREATE MIX DESIGN DATA RECORD

The information required by this mix design is entered as shown in SCREEN IMAGE 4.3. The data nomenclature on the screen is the same as that displayed in the Mix Design. There should be little difficulty in matching up the items. This information will be used each and every time a "CONCRETE TEST REPORT" is logged. If you make a mistake in an item entry, and have pressed the enter key, you can backtab providing cursor is at the first position of the next field. You are also given the opportunity to correct all fields by KEYING in an 'R' for reenter. the CURSOR will go to the first field. If ok press enter and the CURSOR will move to the next field and eventually you will arrive at the data item to correct. When you have gone through the entire screen and all data is correct, KEY in an 'L' and the mix design will be logged.

If concrete class is other than 'A' or 'S', program will prompt you for "ENTER BREAK TIME" and "DAYS" or "HRS" shown in lower right corner. This is to accomodate any concrete design based on PSI strength within a set duration of DAYS or HOURS. Keying a 'C' to Calculate Agg. Wt's is applicable to CLASS 'A' concrete only and is explained on the following page.

NOTE: A unique concrete design will be determined through the use of fields "CLASS CODE", "PSI", and "DESIGN NUMBER". PSI should be input to even 10 psi increments. The use of a "VENDOR CODE" and a "PRODUCT CODE" is optional at this time. However, these codes should be standarized within the department at some future time.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

CREATING or EXTENDING MIX DESIGN DATA FILE

PROJ. CODE	CLASS CODE	STRENGTH PSI	DESIGN NUMBER	DESIGN DATE	DESIGN SLUMP	DESIGN AIR	VENDOR CODE	PRODUCT CODE
1112	S	3000.	1	042384	3.5.	1...	SANX #1	1234567

MATERIAL	TYPE	%	SOURCE	WT/CU./YD.	SP.GR.	F/M	% ABS.
CEMENT	II	...	PHX/CEM CLRKSDL	480.	3.15.
F/AGG	SANTA CRUZ RVR.	1317	2.59.
C/AGG #1	57	...	SANTA CRUZ RVR.	1745	2.59.
C/AGG #2
WATER	285.	1.0..

ADDITIVE	TYPE	AMOUNT-UNIT-CU.YD.
POZZLAN.....	F.....	110.... ENTER BREAK TIME..
WRDA 79.....	60Z/CWT
.....

LOG	REENTER	CALCULATE AGG. WT'S	QUIT
-----	---------	---------------------	------

SCREEN IMAGE 4.3

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.0 -- CONCRETE UTILITY PROGRAM
SECTION 1.1 ---- CREATE MIX DESIGN RECORD

If you are entering a class 'A' concrete mix design and are using %'s of the total aggregate as shown in SCREEN IMAGE 4.3 , the program will prompt you for % of crushed faces on both coarse aggregates as displayed by SCREEN IMAGE 4.31. Upon entering the data, SCREEN IMAGE 4.32 will display the adjusted aggregate weights.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE PROJECT NUMBER PROJECT NAME
1112 IXF-084-(0) ***** TEST PROJECT *****

ENTER % CRUSHED FACES ON C/AG #1 95

ENTER % CRUSHED FACES ON C/AG #2 ..

SCREEN IMAGE 4.31

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

CLASS 'A' DESIGN #1

DATE ADJUSTED = 09 02 84

MATERIAL	DESIGN WT. (%)	ADJ. WEIGHT (%)	ADJ. BATCH WEIGHT
CEMENT	480	480	480
F/AGG	1317 (41)	892 (28)	892
C/AGG #1	1745 (59)	2295 (72)	2295
C/AGG #2			
WATER	285	285	285
ADMIX #1	POZZLAN	F	110 /CU.YD.
ADMIX #2	WRDA 79		60Z/CWT/CU.YD.
ADMIX #3			

MATERIAL	SOURCE	TYPE	Sp/Gr	% Abs.	% Moist	Dsgn F/M	Act F/M
CEMENT	PHX/CEM CLRKSDL II		3.15				
F/AGG	SANTA CRUZ RVR		2.59	3.5	3.5	3	3
C/AGG #1	SANTA CRUZ RVR	57	2.59	.8	.8	6	6
C/AGG #2							

PRINT

LOG

QUIT

SCREEN IMAGE 4.32

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.0 -- CONCRETE UTILITY PROGRAM
SECTION 1.2 ---- DISPLAY A MIX DESIGN

To DISPLAY A MIX DESIGN, the program will prompt you for three items as shown in SCREEN IMAGE 4.4 After responding with the last item entered, SCREEN IMAGE 4.5 will appear for your inspection or to edit any changes required. Keying a 'P' will send screen image to printer. Keying an 'L' will relog concrete mix design.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE PROJECT NUMBER PROJECT NAME
1112 IXF-084-(0) ***** TEST PROJECT *****

ROUTINE TO DISPLAY A CONCRETE MIX DESIGN

ENTER CLASS OF CONCRETE S
ENTER STRENGTH PSI 3000.
ENTER MIX DESIGN NUMBER (1 to 9) 1

SCREEN IMAGE 4.4

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

CREATING or EXTENDING MIX DESIGN DATA FILE

PROJ. CODE	CLASS CODE	STRENGTH PSI	DESIGN NUMBER	DESIGN DATE	DESIGN SLUMP	DESIGN AIR	VENDOR CODE	PRODUCT CODE
1112	S	3000.	1	042384	3.5.	1...	SANX #1	1234567

MATERIAL	TYPE	%	SOURCE	WT/CU./YD.	SP.GR.	F/M	% ABS.
CEMENT	II	...	PHX/CEM CLRKSDL	480.	3.15.
F/AGG	SANTA CRUZ RVR.	1317	2.59.
C/AGG #1	57	...	SANTA CRUZ RVR.	1745	2.59.
C/AGG #2
WATER	285.	1.0..

ADDITIVE	TYPE	AMOUNT-UNIT-CU.YD.
POZZLAN.....	F.....	110....
WRDA 79.....	60Z/CWT
.....

LOG	REENTER	CALCULATE AGG. WT'S	PRINT	QUIT

SCREEN IMAGE 4.5

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.0 -- CONCRETE UTILITY PROGRAM
SECTION 1.4 ---- ADJUST A MIX DESIGN

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM									
CLASS 'A' DESIGN #1					DATE ADJUSTED = 09 02 84				
MATERIAL		DESIGN WT. (%)		ADJ. WEIGHT (%)		ADJ. BATCH WEIGHT			
CEMENT		480		480		480			
C/AGG #1		1745 (55)		6821 (14)		7026			
C/AGG #2									
F/AGG		1317 (45)							
WATER		285		285		80			
ADMIX #1		POZZLAN		F		110 /CU.YD.			
ADMIX #2		WRDA 79				60Z/CWT/CU.YD.			
ADMIX #3									
MATERIAL	SOURCE	TYPE	Sp/Gr	% Abs.	% Moist	Dsgn F/M	Act F/M		
CEMENT	PHX/CEM CLRKSDL	II	3.15						
C/AGG #1	SANTA CRUZ RVR	57	2.59		3		2.5		
C/AGG #2					.01		7		
F/AGG			2.59		.01		7		
PRINT			LOG		RETURN				

SCREEN IMAGE 4.7									

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.1 -- CONCRETE CYL. LOGS
SECTION 1.0 ---- OPTIONS

Choosing "CONCRETE CYL. LOGS" from the previous menu, you are now shown a new menu as displayed in SCREEN IMAGE 4.8 . Lets opt for "LOG CYLINDER (Field Test Data)" first.

```
-----  
                ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM  
  
PROJECT CODE      PROJECT NUMBER      PROJECT NAME  
  1112            IXF-084-(0)          ***** TEST PROJECT *****  
  
                CONCRETE CYLINDER LOGS  
  
*****  
* (4.1.1-1.1)    - LOG CYLINDER (FIELD TEST DATA      *  
*****  
  (4.1.1-1.2)    - LOG CYLINDER (LABORATORY TEST DATA)  
  
  (4.1.1-1.3)    - DISPLAY CONCRETE CYLINDER TESTS  
  
  (4.1.1-1.4)    - EDIT FIELD TEST DATA  
  
                RETURN  
  
                USE    OR    AND THEN ENTER  
  
-----  
                SCREEN IMAGE    4.8  
-----
```

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.1 -- CONCRETE CYL. LOGS
SECTION 1.1 ---- LOG CYLINDER (FIELD TEST DATA)

This is EXAMPLE #16 in the appendix and shows both field data and laboratory data associated with the mix design we entered in example #15.

EXAMPLE #16 EXAMPLE #16 EXAMPLE #16 EXAMPLE #16

SCREEN IMAGE 4.81 will first prompt you as shown for CLASS, STRENGTH PSI & MIX DESIGN NUMBER associated with sample data. After entering last data item the program checks for valid mix design record and if OK will respond with SCREEN IMAGE #4.82. If a match record is not found, a message "DESIGN PARAMETERS NOT FOUND" will appear on the screen and will further prompt you as to what you may do, (REENTER or RETURN).

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

CONCRETE CLY. LOGS .(LABORATORY TEST DATA)

ENTER CLASS OF CONCRETE S
ENTER STRENGTH PSI 3000.
ENTER MIX DESIGN NUMBER USED 1

SCREEN IMAGE 4.81

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.1 -- CONCRETE CYL. LOGS

SECTION 1.1 ---- LOG CYLINDER (FIELD TEST DATA)

SCREEN IMAGE 4.82 will prompt you for the information as shown. Many data item values are exhibited as you move your CURSOR to the next field. You may change them as you wish or leave them as displayed. Here again the nomenclature used by the "CONCRETE TEST REPORT" and that displayed in the screen is the same. After data has been visually checked and you choose to key an 'L' as shown by the line I have indexed with an " A====> ", the data record will be logged and the line will be replaced with that exhibited as " B====> ". The screen will allow you to go back through all of the data item fields and change only those representing another CYLINDER TEST REPORT, and log it as well if a 'C' for continue is entered. This will be repeated until you key a 'Q'.

NOTE: Keying a 'Q', in LINE A will not log the last test record you have entered on the screen.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE				PROJECT NUMBER			PROJECT NAME		
1112				IXF-084-(0)			***** TEST PROJECT *****		
PROJ CODE	CLASS CODE	STRN PSI	DSGN NO.	CYL. NO.	DATE (MMDDYY)	TIME (HHMM)	BATCH QUANTITY	TICKET NUMBER	
1112	S	3000	1	5...	090284	0900	8.5.	1000	
ADMIX #1 AMOUNT		ADMIX #2 AMOUNT		ADMIX #3 AMOUNT		+/- GAL AT PLANT	FLY ASH LB/CY	QTY REP BY TEST	+ GAL @ SITE
110			84....	...	50..	...
SAMPLED BY	DIR	STATION (####+##)		PLACED IN PART OF STRUCTURE		STR. NO.	AIR %	SLUMP IN.	CONC TEMP
ZZZZ....	EB	100+00		FLOOR.....		14..	2 ..	4.0.	84 100
A =====>				LOG		REENTER		QUIT	
B =====>				CONTINUE		QUIT			

SCREEN IMAGE 4.82

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.1 -- CONCRETE CYL. LOGS

SECTION 1.2 ---- LOG CYLINDER (LABORATORY TEST DATA)

This is EXAMPLE #16 in the appendix and shows both field data and laboratory data associated with the mix design we entered in example #15.

EXAMPLE #16

EXAMPLE #16

EXAMPLE #16

EXAMPLE #16

SCREEN IMAGE 4.83 will first prompt you as shown for CLASS, STRENGTH PSI, MIX DESIGN NUMBER & CYL. TEST NUMBER so that it can retrieve that record previously logged in the procedure "LOG CYLINDER (FIELD TEST DATA)", and attach to it the requested data displayed in the rest of the screen. A message "TEST SPECIFIED NOT FOUND" will appear on the screen if no match is found after entering the first four items. The program will then prompt you as to what to do next (REENTER or RETURN).

As in the "FIELD TEST DATA" entry system the program will allow you to remain on this screen and enter all your CYLINDER BREAKS without going to another menu. Here again the nomenclature used on the "CONCRETE TEST REPORT" and that displayed on the screen is the same. After data has been visually checked and you choose to key an 'L' as shown by the line I have indexed with an "A====>", the data record will be logged and the line will be replaced with that exhibited as "B====>". The screen will allow you to go back through all of the data item fields and change only those representing another CYLINDER TEST REPORT, and log it as well if a 'C' for continue is entered. This will be repeated until you key a 'Q'.

NOTE: Keying a 'Q', in LINE A will not log the last test record you have entered on the screen.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

CONCRETE CYL. LOGS (LABORATORY TEST DATA)

ENTER CLASS OF CONCRETE S
ENTER STRENGTH PSI 3000
ENTER MIX DESIGN NUMBER USED ? 1
ENTER CYL. TEST NUMBER ? 1

TEST	S(7)	C(28)	S1(28)	S2(28)	AVE(28)
1..	1945	3268	3420	3490	3455

A ====> LOG REENTER QUIT

B ====> CONTINUE QUIT

SCREEN IMAGE 4.83

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.1 -- CONCRETE CYL. LOGS

SECTION 1.3 ---- DISPLAY CONCRETE CYL. TEST OPTIONS

By choosing "DISPLAY CONCRETE CYLINDER TESTS" from your previous menu, SCREEN IMAGE 4.84 is now before you. The options are selective criterion in which you can limit a grouping of cyl report records for some special consideration.

The options are fairly self explanatory. I would simply experiment with all the choices to familiarize yourself with the results. Each one will prompt you for one to three items of information. The program will next ask if you want a "SCREEN LISTING" or a "PRINTED REPORT". TRY IT.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

CONCRETE CYL. TESTS

DISPLAY OPTIONS

- TEST # TO TEST #
- BY CLASS CODE
- BY STRENGTH PSI
- BY DESIGN NUMBER
- DATE TO DATE
- BY STRUCTURE NUMBER
- RETURN

OR AND THEN ENTER

SCREEN IMAGE' 4.84

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 4.1.1 -- CONCRETE CYL. LOGS
SECTION 1.4 ---- EDIT FIELD TEST DATA

By choosing "EDIT FIELD TEST DATA" from your previous menu, SCREEN IMAGE 4.85 is now before you. This list of records represents all tests or cylinder #'s for which FIELD TEST DATA has been previously entered through the LOG CYLINDER FIELD TEST DATA routine.

All field test data entered resides in a holding file. Upon entering LABORATORY TEST DATA and completing the entire concrete record, it is then passed on to the WEEKLY HOLDING FILE. In other words, this file contains all records for which no LABORATORY TEST DATA has been entered.

You have the option to EDIT or change an existing record, DELETE a record or QUIT. The program will prompt you for record number for either edit or delete. If you choose to EDIT and supply the record number, the program takes you to SCREEN IMAGE 4.82 SECTION 1.1 and continues as if you were doing a reentry of the data.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE PROJECT NUMBER PROJECT NAME
1112 IXF-084-(0) ***** TEST PROJECT *****

REC #	CLASS CODE	PURPOSE CODE	STRENGTH PSI	DESIGN #	TEST #
1	S	A	3000	1	99
2	P	A	6000	2	6
3	A	A	2500	1	3
4	P	A	6000	2	7
5	P	A	6000	2	8
6	P	A	6000	2	9

EDIT DELETE QUIT

SCREEN IMAGE 4.85

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.0 -- PRINT/EDIT REPORTS
SECTION 1.0 ---- OPTIONS

Having chosen "PRINT/EDIT REPORTS" on the first menu, which is shown as SCREEN IMAGE 5.1, the message "DAILY WEEKLY HISTORICAL" will appear at the bottom of the screen. You are to choose which set of tests are to be used. All tests when first entered are put into the DAILY file until they are uploaded to the mainframe. If the tests you wish to use have not been uploaded to the mainframe, then you should choose "DAILY". After uploading to the mainframe occurs, they are automatically transferred into the "WEEKLY" file. If the tests you wish to use have been uploaded to the mainframe, but you have not yet made your weekly report, you should use "WEEKLY". After the weekly report has been made, the tests should be transferred into the historical file using the "TRANSFER TO HISTORICAL" sub-option of "TRANSFER DATA BASE." If the tests you wish to use were made before the last weekly report, then you should choose "HISTORICAL". Once you choose which set of tests are to be used, the correct files are opened and sorted.

If you have chosen DAILY or WEEKLY, the screen will then display the message "MATERIAL FILE SORT IN PROGRESS ----- PLEASE STANDBY". After a time, depending on how many records are to be sorted, the screen will prompt you with "ENTER REPORT DATE (MMDDYY)". This is the date that will be printed at the top of the reports showing status date of your reports.

After keying in the desired date, the screen will clear and SCREEN IMAGE 5.3 will appear. You are now ready to produce reports and edit any records logged subsequent to your last execution of the procedure in this menu named "TRANSFER DATA BASE". Transferring to historical will move ALL the logged records for ALL projects from the weekly holding file in which they are all stored to multiple files, individually containing each projects' records commonly named "PROJECT HISTORICAL FILE".

This means you MUST run your "WEEKLY REPORTS" prior to running "TRANSFER TO HISTORICAL". There is no possible way to retrieve just those records entered during the past weekly period after "TRANSFER TO HISTORICAL" is run.

If you chose "HISTORICAL" on the first menu, the screen will display SCREEN IMAGE 5.2. Since all historical records are stored in multiple project files, the menu prompts you for the type or category of record. After selecting one of the types, the message "MATERIAL FILE SORT IN PROGRESS ---- PLEASE STANDBY" appears. After a time, depending on how many records are to be sorted, the screen will prompt you with "ENTER REPORT DATE (MMDDYY)". You are now ready to "EDIT" or produce "REPORTS" from this one file.

With the exception of "TRANSFER DATA BASE", which is not applicable to the historical files, the program is identical in every way with the "DAILY" or "WEEKLY" options. This means you can SCREEN or PRINT a complete history of materials testing on any of your projects.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.0 -- PRINT/EDIT REPORTS
SECTION 1.0 ---- OPTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ROUTINES

(3.1.0)	MATERIALS CALCULATION ROUTINES
(4.1.0)	EXECUTE CONCRETE UTILITY PROGRAM

* (5.1.0)	PRINT/EDIT REPORTS *

(7.1.0)	MISCELLANEOUS TEST CALCULATIONS
(8.1.0)	STATISTICAL ANALYSIS ROUTINES
(9.1.0)	PROJECT ID FILE TRANSACTIONS
(10.1.0)	END OR CHANGE PROJECTS

DAILY	WEEKLY	HISTORICAL
-------	--------	------------

SCREEN IMAGE 5.1

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.0 -- PRINT/EDITS REPORTS
SECTION 1.0 ---- OPTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

MATERIAL LOG EDITING OPTIONS

- SOILS AND AGGREGATE GRADATION
- ASPHALTIC CONCRETE EXT. & VMA
- CONCRETE CYL. LOGS
- SOILS COMPACTION (densities)
- SOILS COMPACTION (proctors)
- ASPHALTIC CONCRETE COMPACTION
- END EDIT PROGRAM

OR AND THEN ENTER

SCREEN IMAGE 5.2

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.0 -- PRINT/EDIT REPORTS
SECTION 1.0 ---- OPTIONS

Lets choose "SCREEN LISTING" to begin with. This is likely to be your normal selection first, as the screen image of "WEEKLY REPORTS" is considerably faster than the printer. Also, if something does not look correct or out of place within each of the different types of reports, you will want to correct it before making a printed copy.

The screen listing is an abbreviated version of the printed weekly report due to limitations of the 80 col. monitor compared to a full 132 col. printer report.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

REPORT OPTIONS

* (5.1.0-1.1) - SCREEN LISTING *

(5.1.0-1.1) - PRINTED REPORT

(5.1.1-1.0) - SCREEN TEST LISTING

(5.1.1-1.0) - PRINTED TEST LISTING

(5.1.1-1.2) - EDIT REPORTS

(5.1.2-1.0) - TRANSFER DATA BASE

SCREEN IMAGE 5.3

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.0 -- PRINT/EDIT REPORTS

SECTION 1.1 ---- SCREEN and/or PRINTED 'WEEKLY REPORTS'

The reports generated from this part of the program are displayed in relation to the way they are sorted. Generally this means they are rearranged in the file so that records of like attributes are placed in an orderly fashion. The order of the weekly report file and the historical project files are as follows.

SORT SEQUENCE	FIELD
1	PROJECT CODE
2	RECORD TYPE (Internally Supplied Code)
3	MATERIAL CODE
4	PURPOSE
5	TYPE CODE
6	SIZE
7	SPEC #
8	TEST #
9	TEST # SUFFIX

If after viewing your reports, you discover something out of order, the problem will usually be something incorrectly keyed or left out of the TABULATION portion of the record when originally entered.

This situation can be dealt with by going back to the menu as displayed in SCREEN IMAGE 5.3 and selecting "EDIT REPORTS". SCREEN IMAGE 5.4 from Chapter 5.1.1, Section 1.0 will appear.

Examples of all the types of WEEKLY REPORTS are represented in APPENDIX D.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.1 -- TEST LISTING

SECTION 1.0 ---- OPTIONS

SECTION 1.1 ---- (DELETED) - (not available at the present time)

Having chosen "TEST LISTING" from the previous menu, you are looking at SCREEN IMAGE 5.4. I would recommend a printed listing so that you can have it to refer to when you make corrections when using "EDIT REPORTS". After printing the listing, the menu displayed in SCREEN IMAGE 5.3 will reappear.

SCREEN IMAGE 5.4 is an example of a screen listing showing records in the order they are stored in the WEEKLY HOLDING FILE. You will notice the first field is a RECORD #. This is developed by the program to aid you in selecting the correct record during editing and corrections.

Please note there are three (3) PROJECT CODES shown in the listing. All materials logged, regardless of project, go into this file.

ADOT MATERIAL PROGRAM PROJECT MATERIALS TEST SUMMARY FOR WEEK ENDING 08 10 1984 SAMPLE TEST LISTING

REC #	PROJ. CODE	MATERIAL CODE	PUR	TYPE CODE	SIZE CODE	SPEC #	TEST #	DATE SAMPLED
1	1111	CM	A	11		1	1	08/06/84
2	1111	CA	A	57		1	1	08/06/84
3	1111	MA	I	AC		2	5	08/06/84
4	1111	MA	I	AC		2	5	08/07/84
5	1112	AC	A	34		1	1	08/07/84
6	1112	AC	A	34		1	2	08/07/84
7	1112	AC	A	34		1	3	08/08/84
8	1113	SB	I			3	6	08/08/84
9	1113	SB	I			3	7	08/09/84

PRESS ANY KEY TO CONTINUE

SCREEN IMAGE 5.4

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.1 -- EDIT REPORTS
SECTION 1.2 ---- EDIT OPTION OF RECORDS

Upon selecting "EDIT REPORTS" from your previous screen, SCREEN IMAGE 5.5 displays another MENU that will limit the type of records you will see in the first portion of the next procedure. Choose "SOILS AND AGGREGATE GRADATION" and we will look at the results in SCREEN IMAGE 5.6 .

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

MATERIAL LOG EDITING OPTIONS

* - SOILS AND AGGREGATE GRADATION *

- ASPHALTIC CONCRETE EXT. & VMA

- CONCRETE CYL. LOGS

- SOILS COMPACTION (densities)

- SOILS COMPACTION (proctors)

- ASPHALTIC CONCRETE COMPACTION

- END EDIT PROGRAM

OR AND THEN ENTER

SCREEN IMAGE 5.5

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.1 -- EDIT REPORTS

SECTION 1.3 ---- LIST OF SOILS AND AGGREGATE GRADATION RECORDS

SCREEN IMAGE 5.6 exhibits those "RECORD TYPES" generated in that area of the program called "SOILS AND AGGREGATE GRADATION". All the record numbers shown in the listing are available to select. Actually all records in the "WEEKLY HOLDING FILE" are available to you while working inside any of the selections shown in IMAGE 5.5 . It is best to try and stay within the proper selection when possible.

In this screen, if we choose to select REC # (record number) 3 to change the TEST NUMBER as we have discovered the test number should have been 4 instead of 5.

Keying in a 3, the screen will then prompt you for what you may do with the record. 'E' for EDIT will bring up SCREEN IMAGE 5.7 . 'R' will allow you to attach remarks to the test record. 'D' will delete the record entirely. If you use 'D' and there are REMARKS records attached, they must also be deleted individually.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

REC #	PROJ. CODE	MATERIAL CODE	SOILS AND AGGREGATE GRADATIONS				TEST #	DATE SAMPLED
			PUR	TYPE CODE	SIZE CODE	SPEC #		
1	1111	CM	A	11		1	1	08/06/84
2	1111	CA	A	57		1	1	08/06/84
3	1111	MA	I	AC		2	5	08/06/84
4	1111	MA	I	AC		2	5	08/07/84

ENTER RECORD NUMBER TO BE EDITED ELSE PRESS ENTER TO LIST NEXT GROUP

EDIT

REMARKS

DELETE

SCREEN IMAGE 5.6

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 5.1.1 -- EDIT REPORTS
SECTION 1.4 ---- EDITING FIELDS

Keying in an 'E' on your previous screen, SCREEN IMAGE 5.7 is now displaying the Tabulation portion of the record. Moving your cursor to any field or fields you wish, simply make the correction. After completing the screen, you may choose any one of the options. If this test was originally stored with REMARKS, it is necessary for you to first delete all remarks records associated with the original test record. After making any correction on the test record, key in an 'R' and reenter your original remarks. After logging the record the program will prompt you to continue or return. Keying a 'C' will take you back to the list of records starting with the next record number. You may now select another record to correct.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE 1112		PROJECT NUMBER IXF-084-(0)				PROJECT NAME ***** TEST PROJECT *****	
PROJ. CODE 1111	MATL HA	TYPE AC	PUR I	LAB P	SPEC # 1	SIZE .	SIZE % ..
TEST # 5...	SUFFIX .	SAMPLED BY LAGUNA..		DATE 072683		TIME 1125	
LIFT # ..	SAMPLED FROM STOCKPILE.....				RDWY ..	STATION+..	
P/E CODE P	RDWY ..		STATION or PIT # TANER#1				
LOG		REMARKS		CORRECTION		QUIT	

SCREEN IMAGE 5.7

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 6.1.0 -- TRANSFER DATA BASE
SECTION 1.0 ---- OPERATIONAL PROCEDURE

Before selecting "TRANSFER DATA BASE" in your previous screen, you should have a complete understanding as to what the process accomplishes and the impact on other reports. There are two options involved in "TRANSFER DATA BASE" as indicated in screen image 5.8 : 1. "TRANSFER TO MAINFRAME", which should be run on a daily basis, will transfer all records and specs entered into the DAILY file to the mainframe data base and transfer the same records to the WEEKLY file. 2. "TRANSFER TO HISTORICAL", which should be run once a week, will move ALL the logged records for ALL projects from the WEEKLY File in which they are stored to MULTIPLE FILES, each containing project records of like type.

This means you MUST transfer the data to the mainframe in order to get an accurate weekly report and you MUST run your "WEEKLY REPORTS" prior to running "TRANSFER TO HISTORICAL." There is no possible way to retrieve just those records entered during the past weekly period after "TRANSFER TO HISTORICAL" is run.

Upon selection of "TRANSFER TO MAINFRAME", you will see screen image 5.9. There MUST be an entry for each field. Each field can be completely overtyped or just press the "ENTER" key to use the default values. Upper case letters must be used. There are two types of modems used with this system: 1. Hayes or Hayes-like; 2. CODEX or CODEX-like. Each has its own characteristics when it comes to dialing up WYLBUR. The default WYLBUR PHONE NO. will work for most stations that utilize a HAYES or HAYES-like modem. For those places that are not connected to the ADOT network, i.e., where you must dial 9 and/or some other access code and the 255 prefix to reach ADOT numbers, you should overtype the WYLBUR PHONE NO. as, e.g., 9,2557502. When the communication program starts up --- as indicated by the heading "MAINFRAME COMMUNICATION" --- and dials the phone number, there is a possibility that that phone line is busy. If this happens, just wait for about 30-35 seconds and you will be prompted for a new number with:

LINE BUSY -- ENTER NEW PHONE NUMBER ?

Another phone number is "7655". Enter it like you did on the first screen. For those stations utilizing a CODEX or CODEX-like modem, just leave the default WYLBUR PHONE NO. alone because manual dialing is required. When the communication program starts up, screen image 5.10 will appear. Once a connection is established, press the "C" key to continue. The WYLBUR USERID is appended to the front of the mainframe dataset name, so do not enter your userid with the dataset name. This also means that you cannot upload into someone else's dataset. Again, when the communication program starts, there is a possibility that the WYLBUR USERID you chose is being used. If this happens, the following prompts will appear:

ENTER NEW WYLBUR USERID ?
ENTER PASSWORD ?

Display of the WYLBUR PASSWORD entry is inhibited, so be careful when this is entered. Consult with your EDP liaison if you do not know to which communication port your modem is attached.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 6.1.0 -- TRANSFER DATA BASE
SECTION 1.0 ---- OPERATIONAL PROCEDURE

When you have "entered" the last field, options will appear at the bottom of the screen as "REENTER GO QUIT". REENTER will put you back at the WYLBUR PHONE NO. prompt and you must start all over. GO will start the transfer to mainframe process. QUIT will take you back to screen image 5.3. Just press the first letter of the option you wish to execute. If the GO option is executed, the following message appears:

MAKE SURE TELEPHONE IS CONNECTED AND/OR MODEM TURNED ON.
(PRESS 'ENTER' WHEN READY)

This gives you time to check everything before communication begins. The actual length of time for this TRANSFER TO MAINFRAME process will vary depending on the number of daily records entered. The whole process of dialing the phone number, logging on to WYLBUR, uploading approximately 40 records, then logging off and returning to the menu (SCREEN IMAGE 5.3) should take about 20-25 minutes.

After selecting "TRANSFER TO HISTORICAL" the machine will take a few minutes to write all the records to the proper "PROJECT HISTORICAL FILE" and will then return to the menu shown in SCREEN IMAGE 5.3. Your "WEEKLY HOLDING FILE" is now void of any records.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 6.1.0 -- TRANSFER DATA BASE
SECTION 1.0 ---- OPERATIONAL PROCEDURE

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

- TRANSFER TO MAINFRAME
- TRANSFER TO HISTORICAL

OR AND THEN ENTER

SCREEN IMAGE 5.8

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 6.1.0 -- TRANSFER DATA BASE
SECTION 1.0 ---- OPERATIONAL PROCEDURE

ARIZONA DEPARTMENT OF TRANSPORTATION

CONSTRUCTION MATERIALS TESTING
WYLBUR AND JCL SETUP

OVERTYPE FIELDS AS NEEDED

WYLBUR PHONE NO. : 7502
WYLBUR USERID :
WYLBUR PASSWORD :

MAINFRAME DATASET : CNTTEMP.DATA
PC COM PORT (1 OR 2) : 1

SCREEN IMAGE 5.9

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 6.1.0 -- TRANSFER DATA BASE
SECTION 1.0 ---- OPERATIONAL PROCEDURE

ARIZONA DEPARTMENT OF TRANSPORTATION
CONSTRUCTION MATERIALS TESTING
MAINFRAME COMMUNICATION

-----DIAL PHONE NUMBER NOW-----

CONTINUE

SCREEN IMAGE 5.10

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 7.1.0 -- MISCELLANEOUS TEST CALCULATIONS
SECTION 1.0 ---- OPTIONS

Having chosen "MISCELLANEOUS TEST CALCULATIONS" from previous menu, shown in SCREEN IMAGE 7.1 , you have a NEW MENU with OPTIONS displayed in SCREEN IMAGE 7.2, asking for the type of CALCULATION you wish to use.

For the most part, these calculation checks are placed here for the laboratory technicians convenience. No permanent record is made of these calculations.

All should be self-explanatory. No further discussion will be made.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ROUTINES

(3.1.0)	MATERIALS CALCULATION ROUTINES
(4.1.0)	EXECUTE CONCRETE UTILITY PROGRAM
(5.1.0)	PRINT, EDIT WEEKLY MATERIALS LOG

* (7.1.0)	MISCELLANEOUS TEST CALCULATIONS *

(8.1.0)	STATISTICAL ANALYSIS ROUTINES
(9.1.0)	PROJECT ID FILE TRANSACTIONS
(10.1.0)	END OR CHANGE PROJECTS

SCREEN IMAGE 7.1

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 7.1.1 -- MENU OF LABORATORY CALCULATION ROUTINES
SECTION 1.0 ---- OPTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

MISCELLANEOUS TEST ROUTINES

(USE FOR CALCULATION CHECKS)

* - MOISTURE ROUTINE *

- PLASTICITY INDEX
- FLAKINESS INDEX
- SP. GR. OF FINE AGG.
- SP. GR. OF COARSE AGG.
- FRACTURED FACES
- RETURN

USE OR AND THEN ENTER

SCREEN IMAGE 7.2

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 8.1.0 -- STATISTICAL ANALYSIS ROUTINE
SECTION 1.0 ---- OPTIONS

By selecting "STATISTICAL ANALYSIS ROUTINE" from the previous menu as shown in SCREEN IMAGE 8.1, a new menu as displayed in SCREEN IMAGE 8.2 is before you. This group of options are for informational purposes only. No permanent logging of data is performed by the program. All four procedures calculates an AVERAGE of the specification sieves of all samples you choose in both the "WEEKLY HOLDING FILE" as well as the "HISTORICAL PROJECT FILE". With the exception of "COLD FEED 3 TEST AVE.", the program also calculates a STANDARD DEVIATION on ALL spec. sieves.

Lets look at "COLD FEED ACCEPTANCE" as shown in SCREEN IMAGE 8.3 in the next section 1.1 .

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT # = IXF-084-1(0)
RE/SUPERVISOR = MR T

NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION

ROUTINES

- (3.1.0) MATERIALS CALCULATION ROUTINES
- (4.1.0) EXECUTE CONCRETE UTILITY PROGRAM
- (5.1.0) PRINT/EDIT REPORTS
- (7.1.0) MISCELLANEOUS TEST CALCULATIONS
- *****
- * (8.1.0) STATISTICAL ANALYSIS ROUTINES *
- *****
- (9.1.0) PROJECT ID FILE TRANSACTIONS
- (10.1.0) END OR CHANGE PROJECTS

USE OR AND THEN ENTER

SCREEN IMAGE 8.1

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 8.1.0 -- STATISTICAL ANALYSIS ROUTINE
SECTION 1.0 ---- OPTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

STATISTICAL ANALYSIS ROUTINE

* (8.1.0-1.1) - COLD FEED ACCEPTANCE *

(8.1.0-1.2) - COLD FEED 3 TEST AVE

(8.1.0-1.3) - ASPHALTIC CONCRETE

(8.1.0-1.4) - MA CRUSHER INFO SAMPLES

(8.1.0-1.5) - PLOTTING ROUTINES

RETURN

SCREEN IMAGE 8.2

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 8.1.0 -- STATISTICAL ANALYSIS ROUTINE
SECTION 1.1 ---- COLDFEED ACCEPTANCE

Selecting "COLDFEED ACCEPTANCE", SCREEN IMAGE 8.3 presents you with a "BOUNCE BAR" to choose a range of ANALYSIS PARAMETERS by any one of the three choices.

"TEST # TO TEST #" will prompt you for a BEGINNING TEST #, an ENDING TEST # and SPEC/MIX DESIGN NUMBER.

"DATE TO DATE" will prompt you for a BEGINNING DATE, an ENDING DATE and SPEC/MIX DESIGN NUMBER.

"ALL TESTS" will prompt you for SPEC/MIX DESIGN NUMBER.

Upon entering the last data item, the program will display on the screen all calculation results as shown in an example in SCREEN IMAGE 8.4 . After viewing the screen, you have a choice to make a printed copy.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

ANALYSIS PARAMETERS

- TEST # TO TEST #
- DATE TO DATE
- ALL TESTS

OR AND THEN ENTER

SCREEN IMAGE 8.3

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 8.1.0 -- STATISTICAL ANALYSIS ROUTINE
SECTION 1.1 ---- COLD FEED ACCEPTANCE

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

STATISTICAL ANALYSIS OF COLD FEED ACCEPTANCE

MIX DESIGN # = 1 THE NUMBER OF TESTS USED WAS 15

SIEVE	AVE OF TESTS	S/DEVSPECIFICATION
1"	100.0	0.000
3/4"	100.0	0.000
3/8"	82.4	3.750
#8	43.6	1.850
#40	15.4	1.325
#200	5.2	0.867

PRINT QUIT

SCREEN IMAGE 8.4

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 8.1.0 -- STATISTICAL ANALYSIS ROUTINE
SECTION 1.2 ---- COLDFEED 3 TEST AVE.

Choosing "COLDFEED 3 TEST AVE", the program uses the LAST three tests made based on a prompted SPEC/HIX DESIGN. The calculations are made and, like the coldfeed acceptance, displays them on your screen.

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 8.1.0 -- STATISTICAL ANALYSIS ROUTINE
SECTION 1.3 ---- ASPHALT CONCRETE

Choosing "ASPHALT CONCRETE", SCREEN IMAGE 8.5 will appear asking you to select the size of AC MIX for the analysis calculations. After selecting one, the program will display another menu as displayed in SCREEN IMAGE 8.6 requesting the range of test samples you wish to use much the same as those used in "COLD FEED ACCEPTANCE" in Section 1.1.

"TEST # TO TEST #" will prompt you for a BEGINNING & ENDING TEST#.
"DATE TO DATE" will prompt you for a BEGINNING & ENDING DATE.
"ALL TESTS" will select all stored tests.
The program will then prompt you for MIX DESIGN # .

Upon entering the last data item, the program will display on the screen all calculation results as shown in an example in SCREEN IMAGE 8.7 . After viewing the screen, you have a choice to make a printed copy.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****
ASPHALTIC CONCRETE		
SELECT TYPE CODE		
- 3/4 Inch Mix		
3/8 Inch Mix		
1/2 Inch Mix		

SCREEN IMAGE 8.5		

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****
ANALYSIS PARAMETERS		
- TEST # TO TEST #		
- DATE TO DATE		
- ALL TESTS		

SCREEN IMAGE 8.6		

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 8.1.0 -- STATISTICAL ANALYSIS ROUTINE
SECTION 1.4 ---- MA CRUSHER SAMPLE TYPES

In SCREEN IMAGE 8.8, you may select any of the sieve groups as a special consideration for analysis. Upon choosing one of the groups, the ANALYSIS PARAMETER menu, as you have seen in the previous sections in this chapter, will prompt you as displayed in SCREEN IMAGE 8.9 .

Upon entering the last data item, the program will display on the screen all calculation results as shown in an example in SCREEN IMAGE 8.10. After viewing the screen, you have a choice to make a printed copy.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

MA CRUSHER INFO SAMPLES

- MA CRUSHER INFORMATIONAL (COARSE)
- MA CRUSHER INFORMATIONAL (INT)
- MA CRUSHER INFORMATIONAL (FINES)
- MA CRUSHER INFORMATIONAL (WASHED FINES)
- RETURN

SCREEN IMAGE 8.8

***** ADOT PROJECT MATERIALS UTILITY PROGRAM *****
ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ANALYSIS PARAMETERS

- TEST # TO TEST #
- DATE TO DATE
- ALL TESTS

SCREEN IMAGE 8.9

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 9.1.0 -- PROJECT ID FILE TRANSACTIONS
SECTION 1.0 ---- OPTIONS

Having chosen "PROJECT ID FILE TRANSACTIONS" from previous menu shown in SCREEN IMAGE 9.1 , you have a new menu with options displayed in SCREEN IMAGE 9.2 . Let us choose "ENTER PROJECT RECORD" as your first transaction we will discuss as shown in SCREEN IMAGE 9.3 .

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

ROUTINES

(3.1.0) MATERIALS CALCULATION ROUTINES

(4.1.0) EXECUTE CONCRETE UTILITY PROGRAM

(5.1.0) PRINT/EDIT REPORTS

(7.1.0) MISCELLANEOUS TEST CALCULATIONS

(8.1.0) STATISTICAL ANALYSIS ROUTINES

* (9.1.0) PROJECT ID FILE TRANSACTIONS *

(10.1.0) END OR CHANGE PROJECTS

USE OR AND THEN ENTER

SCREEN IMAGE 9.1

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 9.1.0 -- PROJECT ID FILE TRANSACTIONS
SECTION 1.0 ---- OPTIONS

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

ROUTINES

* (9.1.0-1.1) - ENTER PROJECT RECORD *

(9.1.0-1.2) - EDIT PROJECT RECORD
(9.1.0-1.3) - DELETE PROJECT RECORD
- RETURN

OR AND THEN ENTER

SCREEN IMAGE 9.2

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 9.1.0 -- PROJECT ID FILE TRANSACTIONS
SECTION 1.1 ---- ENTER PROJECT CODE

A record of project information is entered ONCE at the beginning of the project as no calculations or logging of test samples will be allowed by the program prior to this operation. SCREEN IMAGE 9.3 will prompt you for five pieces of information. The PROJECT code is an arbitrary number you can assign yourself. It can be numeric, alpha, or alpha-numeric. You should use all four (4) spaces provided. No 2 or 3 digit characters. There are no other restrictions on the other four data items, as they are used solely for informational purposes.

If you make a mistake keying you may use the LEFT/RIGHT cursor positional keys to align the cursor to strike over that portion which is incorrect, before you press the ENTER KEY. If you discover an error after pressing ENTER KEY, you may backtab as long as cursor is in the first position of the next field. You can also option to key in an 'R' upon completing the screen and the program will place the cursor at the first field. You are then able to make any corrections necessary.

After the screen is correct enter an 'L' and the project record will be catalogued. SCREEN IMAGE 9.2 will reappear for further processing at this point. If you are finished working in PROJECT CODE FILE select RETURN and program will take you to selection of PROJECT CODE, SCREEN IMAGE 2.2 for continued work.

***** NOTE *****

DO NOT CHANGE PROJECT CODE AFTER
YOU BEGIN ENTERING MATERIAL DATA

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
EXTENDING PROJECT RECORD DATA FILE

PROJECT CODE = 1112
PROJECT NUMBER = 1XF-084-(0)....
PROJECT NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION...
RE/SUPERVISOR = MR T.....

LOG REENTER QUIT

SCREEN IMAGE 9.3

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 9.1.0 -- PROJECT ID FILE TRANSACTIONS
SECTION 1.2 ---- EDIT PROJECT RECORD

SCREEN IMAGE 9.4 as an example displays all projects defined to the "PROJECT CODE FILE". Selecting a project to change some data item, such as 'RE/SUPERVISOR', is accomplished by keying in the NO. digit just to the left of CODE. This is the record number as it exists in the file. It has no other use than to describe to the program the exact location of the record we want. After keying in the NO. (2), as an example, SCREEN IMAGE 9.5 will appear with all the current data and place the CURSOR in the first field. Press enter until you reach the field you wish to change. Upon completing correction, continue to press the ENTER key until all fields are addressed. At this point key the numerical digit associated with your choice of operations.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM				
NO.	CODE	PROJECT NUMBER	PROJECT NAME	RE/SUPERVISOR
1	1111	IR-10-4(05)	1-17 PRINCE RD TO I-19	DEWAYNE TRIPP
2	1112	IXF-084-(0)	***** TEST PROJECT *****	MR T

99=RETURN ENTER NO. OF RECORD TO BE EDITED

SCREEN IMAGE 9.4

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
EDIT PROJECT RECORD

PROJECT CODE = 1112
PROJECT NUMBER = 1XF-084-(0)....
PROJECT NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION...
RE/SUPERVISOR = MR T.....

LOG	REENTER	QUIT
-----	---------	------

SCREEN IMAGE 9.5

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 9.1.0 -- PROJECT ID FILE TRANSACTIONS
SECTION 1.3 ----- DELETE PROJECT RECORD

Choosing to "DELETE PROJECT RECORD" from previous menu, SCREEN IMAGE 9.6 as an example will be displayed. The listing is identical to that described in "EDIT PROJECT RECORD" in Section 1-2 with the exception of the choice of record NO. will delete the entire record from the file. Keying a 'Q' will do nothing and program will exit to previous menu. Keying a (2) would delete the record associated with CODE NUMBER 1112.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

NO.	CODE	PROJECT NUMBER	PROJECT NAME	Re/SUPERVISOR
1	1111	IR-10-4(85)	I-10 PRINCE ROAD TO I-19	DEWAYNE TRIPP
2	1112	IXF-084-(0)	***** TEST PROJECT *****	MR T

ENTER NO. OF RECORD TO BE DELETED

QUIT

SCREEN IMAGE 9.6

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 10.1.0 -- END OR CHANGE PROJECT
SECTION 1.0 ----- OPTIONS

In choosing "END OR CHANGE PROJECTS", from previous menu as shown
in SCREEN IMAGE 10.1, we have two selections as shown in SCREEN IMAGE
10.2 .

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT # = IXF-084-1(0)
RE/SUPERVISOR = HR T

NAME = ***** TEST PROJECT *****
CONTRACTOR = LIGHTNING CONSTRUCTION

ROUTINES

(3.1.0) MATERIALS CALCULATION ROUTINES
(4.1.0) EXECUTE CONCRETE UTILITY PROGRAM
(5.1.0) PRINT/EDIT REPORTS
(7.1.0) MISCELLANEOUS TEST CALCULATIONS
(8.1.0) STATISTICAL ANALYSIS ROUTINES
(9.1.0) PROJECT ID FILE TRANSACTIONS

* (10.1.0) END OR CHANGE PROJECTS *

USE OR AND THEN ENTER

SCREEN IMAGE 10.1

*** CONSTRUCTION MATERIALS TESTING ***

CHAPTER 10.1.0 -- END OR CHANGE PROJECT
SECTION 1.0 ----- OPTIONS

Selecting "CHANGE PROJECT CODE" will take you to the beginning of the materials program as described in CHAPTER 2.0, SECTION 1.0 and illustrated by SCREEN IMAGE 2.2 . The primary function is to select a different project with which you wish to work. No other method in the program will allow you to "CHANGE PROJECT CODE".

Selecting "RETURN TO CONSTRUCTION MASTER MENU" will take you completely out of the "MATERIALS LOGS" procedures and bring up the "ADOT CONSTRUCTION MICRO-COMPUTER SYSTEM MASTER MENU" as shown in SCREEN IMAGE 2.1 in Chapter 2.0, Section 1.0 . This now gives you access to other system applications and MSDOS.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM

PROJECT CODE	PROJECT NUMBER	PROJECT NAME
1112	IXF-084-(0)	***** TEST PROJECT *****

(2.0-2.2) - CHANGE PROJECT CODE

(2.0-2.2) - RETURN TO CONSTRUCTION MASTER MENU

OR AND THEN ENTER

SCREEN IMAGE 10.2

*** CONSTRUCTION MATERIALS TESTING ***

APPENDIX A -- INSTALLATION
(Getting Started)

The diskette furnished with your system has been designed to perform the "housekeeping" chores of starting the CMT system for the first time or installing an updated or new release of the program. The automated procedure is based on the computer equipment configuration designed for construction offices.

computer: IBM PC 128k minimum
storage: Two floppy drives
Two fixed drives
clock: AST Megaplug boards
assumption: Fixed Disk "E" is the primary drive.
Fixed Disk "F" is the backup drive.

PROCEDURE:

1. Computer is OFF or turn machine OFF.
2. Turn computer on and wait for "ADOT CONSTRUCTION MICRO-COMPUTER SYSTEM MASTER MENU" to appear.
3. Insert system diskette in drive "A" -- close door.
4. Key in command as displayed below and PRESS ENTER.
A:MATERIAL

The result of the automatic installation procedure is to create:

- + Directory/Path
- + Batch Files
- + Program Files
- + Sample Data Files

The next step is to create a backup copy of the system.

*** CONSTRUCTION MATERIALS TESTING ***

APPENDIX B -- BACKUP PROCEDURE
(Protecting work invested)

The purpose of a "backup" copy of the CMT system is to reduce the effort required to "reconstruct" the system after a CATASTROPHE. A catastrophe is any series of events that lead to a disastrous conclusion. Power failures, equipment failures, and "pilot error" may create a disaster.

Backup copies of your work on both the fixed disk and a floppy disk will be required to reconstruct the CMT system.

Schedule the backup procedure for a floppy diskette each month. Only one month of transactions would have to be re-created if floppy backup copy is used.

Backup copies for the fixed disk should be more frequent. Make a fixed disk backup copy of your work under any of the following conditions.

- + backup at least every Friday
- + backup prior to any procedure that carries significant "risk".
- + backup after any large amount of data has been entered.

The backup procedure is reached by selecting Option 10 from the MASTER MENU.

ADOT CONSTRUCTION MICRO-COMPUTER SYSTEM
MASTER MENU

- | | |
|----------------------------------|------------------|
| 1. Office Logs | (Basic) |
| 2. Materials Logs | (Basic) |
| 3. Lotus 1-2-3 | (Spreadsheet) |
| 4. Prof Editor | (Screen Editor) |
| 5. Personal Editor | (Screen Editor) |
| 6. Smart Com | (Communications) |
| 7. Word Processing | (Multimate) |
| 8. Multimate Tutorial | |
| 9. Staffing Plan | (Lotus 1-2-3) |
| 10. Backup & Recovery Procedures | |

SELECT THE NUMBER OF THE OPTION YOU WANT

*** CONSTRUCTION MATERIALS TESTING ***

APPENDIX B -- BACKUP PROCEDURE
(continued)

The results of the backup procedures will be displayed on the printer. This output can be attached to the cover of the diskette or filed.

PRINTER "ON" AND "SELECTED".

The following instruction screen is displayed.

BACKUP AND RECOVERY PROCEDURES

=BACKUP= KEY WORD = BU
TO = HARD OR FLOPPY
WHAT = MATERIAL
ALL PROJECTS = ALL
Example- BU HARD MATERIAL ALL

=RECOVERY= KEY WORD = RE
FROM = HARD OR FLOPPY
WHAT = MATERIAL
ALL PROJECTS = ALL
Example- RE FLOPPY MATERIAL ALL

=RETURN TO MENU= KEY WORD = MENU

TYPE IN APPROPRIATE COMMAND AND PRESS ENTER

Structure the backup command for the intended purpose:
BU FLOPPY MATERIAL ALL (creates floppy copy of all projects)
BU HARD MATERIAL ALL (creates fixed disk copy of all projects)

*** CONSTRUCTION MATERIALS TESTING ***

APPENDIX C -- RECOVERY PROCEDURE
(Something went wrong)

A catastrophe has occurred and you want to restore the system to the stage it was in when the backup was created.

You understand of course that any valid transactions entered after backup was created must be re-entered to fully restore the system.

Select Option 10 -- Backup and Recovery Procedures from the MASTER MENU.

ADOT CONSTRUCTION MICRO-COMPUTER SYSTEM	
MASTER MENU	
<hr/>	
1. Office Logs	(Basic)
2. Materials Logs	(Basic)
3. Lotus 1-2-3	(Spreadsheet)
4. Prof Editor	(Screen Editor)
5. Personal Editor	(Screen Editor)
6. Smart Com	(Communications)
7. Word Processing	(Multimate)
8. Multimate Tutorial	
9. Staffing Plan	(Lotus 1-2-3)
10. Backup & Recovery Procedures	

SELECT THE NUMBER OF THE OPTION YOU WANT

*** CONSTRUCTION MATERIALS TESTING ***

APPENDIX C -- RECOVERY PROCEDURE
(continued)

The results of the recovery procedure will be displayed on the printer. This output can be attached to the diskette cover or filed for future reference. The first step is then to switch

PRINTER "ON" AND "SELECTED".

The following instruction screen is displayed.

BACKUP AND RECOVERY PROCEDURES

=BACKUP= KEY WORD = BU
TO = HARD OR FLOPPY
WHAT = MATERIAL
ALL PROJECTS = ALL
Example- BU HARD MATERIAL ALL

=RECOVERY= KEY WORD = RE
FROM = HARD OR FLOPPY
WHAT = MATERIAL
ALL PROJECTS = ALL
Example- RE FLOPPY MATERIAL ALL

=RETURN TO MENU= KEY WORD = MENU

TYPE IN APPROPRIATE COMMAND AND PRESS ENTER

Structure the recovery command for the intended purpose:
RE FLOPPY MATERIAL ALL (restores all projects from floppy)
RE HARD MATERIAL ALL (restores all projects from fixed disk)

*** CONSTRUCTION MATERIALS TESTING ***

APPENDIX D

***** TEST PROJECT - MATERIAL SAMPLES *****

The following has been deleted:

Examples 10 thru 14

Examples 17 and 19

EXAMPLE #1.

MATERIALS SECTION
SOIL AND AGGREGATE TABULATION

RECEIVED DATE

LAB NUMBER: G 1 3 7 6
PROJ CODE: 1 1 1 2
MATL: A 1
TYPE: A 1
PUR-POSE: I
LAB: P
SPEC #: 1
SIZE: 1
SIZE: 2

TEST NO.: 22
LOT OR SUFFIX: 1
SAMPLED BY: JONES
MO.: 07
DAY: 21
YEAR: 84
TIME: 12:12

LIFT NO.: 47
SAMPLED FROM: 20' LEF C/L
ROWY: E B
STATION: 11
PLUS: 50

P = PIT
E = EXC.
I = IN PLACE
ORIGINAL SOURCE: ROWY 73 STATION OR PIT NO. 18850
PROJECT NUMBER: IXF-084(0)
IF MILEPOST, INPUT DECIMAL IN COL. 69

REMARKS: G 2 EXAMPLE SOIL AND AGGREGATE
KEYPUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards

% OVERSIZE ARIZ 201		COARSE FACTOR		CUMULATIVE % RET. FINENESS MODULUS	
G	3	3	11	019608	
WEIGHTS RETAINED	% RET.	% PASS	SPECS.		
3" <input type="checkbox"/>	12		X		
2 1/2" <input type="checkbox"/>	17				
2" <input type="checkbox"/>	22				
1 1/2" <input type="checkbox"/>	27				
1" <input type="checkbox"/>	32		X		
3/4" <input type="checkbox"/>	37	0			
1/2" <input type="checkbox"/>	42	360	7	93	
3/8" <input type="checkbox"/>	47	880	17	76	X
1/4" <input type="checkbox"/>	52	1300	26	50	
#4 <input type="checkbox"/>	57	380	7		X
#10 <input type="checkbox"/>	62	2180	43		
Total	67	5100			

Liquid Limit (LL)	T - 49 O - 423	41	43
Plastic Limit (PL)	T - 90 O - 424	44	45
Plasticity Index (PI) = LL - PL	T - 90 O - 424	46	47
Abrasion (A, B, C, D)	T - 90 C - 131	48	
≥ 100 Revolutions		49	50
≥ 500 Revolutions		51	52
Absorption, H ₂ O	ARIZ 211	53	54
Specific Gravity, SSD	ARIZ 211	57	60
Specific Gravity, OD	ARIZ 211	61	64

SPECS: Z
T = AASHTO Tests
C & O = ASTM Tests

Sand Equivalent, SE = $\frac{S}{C} \times 100$	T - 176 O - 2419	63	64
--	---------------------	----	----

≥ 75 AA

WT PASS		FINE SIEVE FACTOR		CUMULATIVE % RET. FINENESS MODULUS	
G	4	539	10	079777	
WEIGHTS RETAINED	% RET.	% PASS	SPECS.		
#8 <input type="checkbox"/>	11	8	35		
#10 <input type="checkbox"/>	14	7	28		
#16 <input type="checkbox"/>	17	6	22		
#30 <input type="checkbox"/>	20	5	17		
#40 <input type="checkbox"/>	23	4	13		
#50 <input type="checkbox"/>	26	3	10		
#100 <input type="checkbox"/>	29	1	9	X	
#200 <input type="checkbox"/>	32	4		X	
Total	35		46		

Fractured Faces Weight (W _f)	(np)		
Total Sample Weight (W _s) = W _u + W _f			
Fractured Faces, FF = $\frac{W_f}{W_s} \times 100$	ARIZ 212	67	68
Wet Weight (W)	(np)		
Dry Weight (D)	(np)		
Moisture Content = $\frac{W-D}{D} \times 100$	T - 255 C - 166	70	72
P(1/4) = % Pass 1/4" Slot		73	74
P(#4) = % Pass #4 Slot		75	76
Fineness Index (FI)	ARIZ 233	77	78
FI = $\frac{F(1/4) + F(1/2) + F(3/4) + F(1) + F(2) + F(4)}{F(1/4) + F(1/2)}$			

AA
FF ≥ 30 for CM-11
AB
≤ 30 Z
for CM-11 & MAPC

FINENESS MODULUS = $\frac{\text{TOTAL CUMULATIVE \% RET.}}{100}$
NECESSARY FOR ALL FA & CA

WHITE ☐
YELLOW ☐
BLUE ☐

TEST OPERATOR

SEE BACK ALSO

LABMAN, PROJECT SUPERVISOR, OR RESIDENT ENGINEER

EXAMPLE #1.

Example #1
Continued

MATERIAL CODES FOR SOILS

SG SUBGRADE
SB SPECIAL BACKFILL
SS SUBGRADE SEAL
NG NATURAL GROUND
BM BEDDING MATERIAL
FM FILTER MATERIAL
GR GRANULATED RUBBER
TS TOP SOIL
BF BACKFILL
EM EMBANKMENT
BL BLOTTER MATERIAL

MIN. AGG. (MA) TYPE CODES

AC ASPHALTIC CONCRETE
BB BIT TREATED BASE
CB CEMENT TREATED BASE
RM ROAD MIX
SC ACSC
FC ACFC
SS SLURRY SEAL
EB EMULSIFIED ASPHALT
BASE COURSE
EF EMULSIFIED ASPHALT
FRICTION COURSE
ES EMULSIFIED ASPHALT
SURFACING

OTHER TYPE CODES:

NM PNEUMATICALLY
PLACED MORTOR
MS MEMBRANE SEAL
GR GROUT

LAB CODES:

C CENTRAL LAB
D DISTRICT LAB
P PROJECT LAB

RDWY CODES:

NB NORTHBOUND
SB SOUTHBOUND, ETC
RA RAMP A
RB RAMP B, ETC.
FR FRONTAGE ROAD
XR CROSS ROAD

PURPOSE CODES:

A ACCEPTANCE
M MISCELLANEOUS
F FINAL
C CONTROL
P PROGRESS
I INFORMATION

AGGREGATE MATL CODES:

CA COARSE AGGREGATE (3,7,57,67,35)
FA FINE AGGREGATE (A,O,S,P,GR,NM)
RR RIP RAP (1,2,3)
AB AGGREGATE BASE (1,2,3)
SM SELECT MATERIAL (1,2,3,4,5,6)
CM COVER MATERIAL (3,8,10,11,MS)
MA MINERAL AGGREGATE (see MA type codes)

MIN. AGG. (MA) SIZE CODES:

STOCKPILES

B BLEND SAND
F FINE STOCKPILE
I INTERMEDIATE S.P.
C COARSE STOCKPILE
K COARSEST STOCKPILE

HOT-PLANT BINS

9 COMPOSITE OF BINS
1 BIN # 1
2 BIN # 2
3 BIN # 3

Specific Gravity and Absorption of Fine Aggregate

ARIZ 211

Bulk sp gr $\frac{A}{B + 500 - C} = \frac{A}{500 - C} =$
(O.D. basis)
where: A = mass of oven-dry sample in air, g.
B = mass of pycnometer filled with water, g. and
C = mass of pycnometer with sample and water to calibration mark, g.
Bulk sp. gr $\frac{500}{B + 500 - C} = \frac{500}{500 - C} =$
(SSD basis)
Absorption, percent $\frac{500 - A}{A} \times 100 = \frac{500 - C}{500 - C} \times 100 =$

Specific Gravity and Absorption of Coarse Aggregate

ARIZ 211

Bulk sp gr $\frac{A}{B - C} = \frac{A}{B - C} =$
(O.D. basis)
where: A = mass of oven-dry sample in air, g.
B = mass of saturated-surface-dry-sample in air, g. and
C = mass of saturated sample in water, g.
Bulk sp gr $\frac{B}{B - C} = \frac{B}{B - C} =$
(SSD basis)
Absorption, percent $\frac{B - A}{A} = \frac{B - C}{B - C} \times 100 =$

SAND READING _____ SAND READING _____ SAND READING _____
CLAY READING _____ CLAY READING _____ CLAY READING _____
SAND EQUIVALENT _____ SAND EQUIVALENT _____ SAND EQUIVALENT _____

AVERAGE SAND EQUIVALENT _____

EXAMPLE #2

MATERIALS SECTION
SOIL AND AGGREGATE TABULATION

RECEIVED DATE _____

LAB NUMBER G 1 3 412				PROJ CODE 1112				MATERIAL E H		TYPE A1		PURPOSE T		LAB P		SPEC # 1		SIZE 19		SIZE 20 21			
TEST NO. 22 6				LOT OR SUFFIX 28 27				SAMPLED BY J JONES				MO. 07		DAY 21		YEAR 84		TIME 01 30					
LIFT NO. 46 3				SAMPLED FROM 130' RT C/L				ROWY 48		STATION 120		PLUS 75											
P=PIT E=EXC. P				ORIGINAL SOURCE 73 74				STATION OR PIT NO. 75 6670				PROJECT NUMBER IXF-084(0)				IF MILEPOST, INPUT DECIMAL IN COL. 69							
I=IN PLACE				IF MILEPOST, INPUT DECIMAL IN COL. 78				REMARKS				USE CAPITAL LETTERS!											

G 2 EXAMPLE OF CALCULATIONS
WHEN USING A #8 SCREEN IN
COARSE SIEVING

KEY/PUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards

% OVERSIZE ARIZ 201				COARSE FACTOR				CUMULATIVE % RET. FINENESS MODULUS			
G 3	8	9	11	007740							
3"	12	14		% RET.	% PASS	SPECS.					
2 1/2"	17	21									
2"	22	26									
1 1/2"	27	31	0	0	100						
1"	32	36	1	1	99						
3/4"	37	41	3250	25	74						
1/2"	42	46	5170	40	34						
3/8"	47	51	2650	21	13						
1/4"	52	56	630	5	8						
#4	57	61	800	6							
#10	62	66	240	2							
Total	67	71	12920								

Liquid Limit (LL)	T - 89 O - 423	41	43
Plastic Limit (PL)	T - 90 O - 424	44	45
Plasticity Index (PI) = LL - PL	T - 90 O - 424	46	47
Abrasion (A,B,C,D)	T - 96 C - 131	48	
3 100 Revolutions		49	50
3 500 Revolutions		51	52
Absorption, H ₂ O	ARIZ 211	53	54
Specific Gravity, SSD	ARIZ 211	57	60
Specific Gravity, CO	ARIZ 211	61	64

SPECS

T = AASHTO Tests
C & D = ASTM Tests

Sand Equivalent, SE = $\frac{S}{C} \times 100$	T - 178 O - 2419	63	64	≥ 75
--	---------------------	----	----	------

WT PASS SPLIT				FINE SIEVE FACTOR			
G 4	240	10		008333			
#8	11	13		% RET.	% PASS		
#16	17	19					
#30	20	22					
#40	23	25					
#50	26	28					
#100	29	31					
#200	32	34					
#400	35	37					
Total							
Elutriation							

Fractured Faces Weight (W _f)	(np)		
Total Sample Weight (W _s) = W _u + W _f			
Fractured Faces, FF = $\frac{W_f}{W_s} \times 100$	ARIZ 212	67	69
Wet Weight (W)	(np)		
Dry Weight (D)	(np)		
Moisture Content = $\frac{W - D}{D} \times 100$	T - 255 C - 366	70	72
P(1/4) = % Pass 1/4" Slot		73	74
P(#4) = % Pass #4 Slot		75	76
Fineness Index (FI) = $\frac{F(1/4) \times P(1/4) + F(#4) \times P(#4)}{F(1/4) + F(#4)}$	ARIZ 233	77	78
FI(1/4 & #4) = % Ret.			

FF ≥ 30 for CM-11

FI ≥ 30 for CM-11 & MAF

FINENESS MODULUS = $\frac{\text{TOTAL CUMULATIVE \% RET.}}{100}$
NECESSARY FOR ALL FA & CA

WHITE ☐
YELLOW ☐
BLUE ☐

TEST OPERATOR _____

SEE BACK ALSO

LABMAN PROJECT SUPERVISOR, OR RESIDENT ENGINEER _____

EXAMPLE #2

MATERIAL CODES FOR SOILS

SG SUBGRADE
SB SPECIAL BACKFILL
SS SUBGRADE SEAL
NG NATURAL GROUND
BM BEDDING MATERIAL
FM FILTER MATERIAL
GR GRANULATED RUBBER
TS TOP SOIL
BF BACKFILL
EM EMBANKMENT
BL BLOTTER MATERIAL

MIN. AGG. (MA) TYPE CODES

AC ASPHALTIC CONCRETE
BB BIT TREATED BASE
CB CEMENT TREATED BASE
RM ROAD MIX
SC ACSC
FC ACFC
SS SLURRY SEAL
EB EMULSIFIED ASPHALT
BASE COURSE
EF EMULSIFIED ASPHALT
FRICTION COURSE
ES EMULSIFIED ASPHALT
SURFACING

OTHER TYPE CODES:

NM PNEUMATICALLY
PLACED MORTOR
MS MEMBRANE SEAL
GR GROUT

LAB CODES:

C CENTRAL LAB
D DISTRICT LAB
P PROJECT LAB

RDWY CODES:

NB NORTHBOUND
SB SOUTHBOUND, ETC
RA RAMP A
RB RAMP B, ETC.
FR FRONTAGE ROAD
XR CROSS ROAD

PURPOSE CODES:

A ACCEPTANCE
M MISCELLANEOUS
F FINAL
C CONTROL
P PROGRESS
I INFORMATION

AGGREGATE MATL CODES:

CA COARSE AGGREGATE (3,7,57,67,35)
FA FINE AGGREGATE (A,D,S,P,GR,NM)
RR RIP RAP (1,2,3)
AB AGGREGATE BASE (1,2,3)
SM SELECT MATERIAL (1,2,3,4,5,6)
CM COVER MATERIAL (3,8,10,11,MS)
MA MINERAL AGGREGATE (see MA type codes)

MIN. AGG. (MA) SIZE CODES:

STOCKPILES

B BLEND SAND
F FINE STOCKPILE
I INTERMEDIATE S.P.
C COARSE STOCKPILE
K COARSEST STOCKPILE

HOT PLANT BINS

9 COMPOSITE OF BINS
1 BIN # 1
2 BIN # 2
3 BIN # 3

Specific Gravity and Absorption of Fine Aggregate

ARIZ 211

$$\begin{aligned} \text{Bulk sp gr (O.D. basis)} &= \frac{A}{B + 500 - C} = \frac{A}{500 - \quad} = \quad \\ \text{where: } A &= \text{mass of oven-dry sample in air, g.} \\ B &= \text{mass of pycnometer filled with water, g. and} \\ C &= \text{mass of pycnometer with sample and water to calibration mark, g.} \\ \text{Bulk sp gr (SSD basis)} &= \frac{500}{B + 500 - C} = \frac{500}{500 - \quad} = \quad \\ \text{Absorption, percent} &= \frac{500 - A}{A} \times 100 = \frac{500 - \quad}{\quad} \times 100 = \quad \end{aligned}$$

Specific Gravity and Absorption of Coarse Aggregate

ARIZ 211

$$\begin{aligned} \text{Bulk sp gr (O.D. basis)} &= \frac{A}{B - C} = \frac{A}{\quad - \quad} = \quad \\ \text{where: } A &= \text{mass of oven-dry sample in air, g.} \\ B &= \text{mass of saturated-surface-dry-sample in air, g. and} \\ C &= \text{mass of saturated sample in water, g.} \\ \text{Bulk sp gr (SSD basis)} &= \frac{B}{B - C} = \frac{\quad}{\quad - \quad} = \quad \\ \text{Absorption, percent} &= \frac{B - A}{A} \times 100 = \frac{\quad - \quad}{\quad} \times 100 = \quad \end{aligned}$$

SAND READING _____ SAND READING _____ SAND READING _____

CLAY READING _____ CLAY READING _____ CLAY READING _____

SAND EQUIVALENT _____ SAND EQUIVALENT _____ SAND EQUIVALENT _____

AVERAGE SAND EQUIVALENT _____

EXAMPLE #3.

MATERIALS SECTION
SOIL AND AGGREGATE TABULATION

RECEIVED DATE

LAB NUMBER: G 1 2 3 4 5 6 7
PROJ CODE: 1 1 1 2
MATL: FA
TYPE: G R
PURPOSE: A
LAB: P
SPEC: 1
SIZE: 19
SIZE: 20 21

TEST NO.: 22 23 24 25 26 27
LOT OR SUFFIX: 1 8
SAMPLED BY: J. JONES
MO.: 07
DAY: 25
YEAR: 84
TIME: 03 30

LIFT NO.: 46 47
SAMPLED FROM: STOCARD PILE
ROWY: 64 65
STATION: 66 67 68 69 70 71
PLUS: 72

P = PIT
E = EXC.
ROWY: 72 73 74 75 76 77 78 79 80
STATION OR PIT NO.:
PROJECT NUMBER: IZF-084(0)
IF MILEPOST, INPUT DECIMAL IN COL. 69

I = IN PLACE IF MILEPOST, INPUT DECIMAL IN COL. 78
REMARKS: G 2 EXAMPLE OF CALCULATIONS FOR SCREENING WHEN FINE AGG. SAMPLE HAS PLUS #4
USE CAPITAL LETTERS!
KEYPUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards

OVERSIZE ARIZ 201

WEIGHTS RETAINED	% RET.	% PASS	SPECS.	CUMULATIVE % RET. FINENESS MODULUS
3" 12				
2 1/2" 17				
2" 22				
1 1/2" 27				
1" 32				
3/4" 37				
1/2" 42				
3/8" 47				
1/4" 52				
#4 57	0	100	100	
#4 62	1	99		
Total 67	56	2		

Liquid Limit (LL)	T - 80 D - 423	41	42
Plastic Limit (PL)	T - 90 D - 424	44	45
Plasticity Index (PI) = LL - PL	T - 30 D - 424	46	47
Abrasion (A, B, C, D)	T - 36 C - 131	48	
# 100 Revolutions		49	50
# 500 Revolutions		51	52
Absorption, H ₂ O	ARIZ 211	53	54
Specific Gravity, SSD	ARIZ 211	57	58
Specific Gravity, OD	ARIZ 211	61	64

SPECS
T = AASHTO Tests
C & D = ASTM Tests

Sand Equivalent, SE = $\frac{S}{C} \times 100$ T - 176 D - 2419 63 64 ≥ 75 AA

WEIGHTS RETAINED	% RET.	% PASS	SPECS.
#8 11	2	94	
#10 14	7	87	
#16 17	17	70	45-80
#30 20	12	58	
#40 23	23	35	
#50 24	7	28	0-30
#100 21	21	7	0-10
#200 24	4		0-40
Total 25	52	3.0	

Fractured Faces Weight (W _f)	(no)		
Total Sample Weight (W _s) = W _u + W _f			
Fractured Faces, FF = $\frac{W_f}{W_s} \times 100$	ARIZ 212	67	68
Wet Weight (W)	(no)		
Dry Weight (D)	(no)		
Moisture Content = $\frac{W-D}{D} \times 100$	T - 235 C - 366	70	72
P(1/4) = % Pass 1/4" Slot		73	74
P(4) = % Pass #4 Slot		75	76
Fineness Index (FI)	ARIZ 233	77	78
FI = $\frac{F(1/4) \times P(1/4) + F(4) \times P(4)}{F(1/4) + F(4)}$			
FI(1/4) & #4 = % Ret.			

AA
FF ≥ 30 for CM-11
AB
 ≤ 30 for CM-11 & MAPC

FINENESS MODULUS = $\frac{\text{TOTAL CUMULATIVE \% RET.}}{100}$
NECESSARY FOR ALL FA & CA
WHITE ☐
YELLOW ☐
BLUE ☐

Example #3
continued

MATERIAL CODES FOR SOILS

SG SUBGRADE
SB SPECIAL BACKFILL
SS SUBGRADE SEAL
NG NATURAL GROUND
BM BEDDING MATERIAL
FM FILTER MATERIAL
GR GRANULATED RUBBER
TS TOP SOIL
BF BACKFILL
EM EMBANKMENT
BL BLOTTER MATERIAL

MIN. AGG. (MA) TYPE CODES

AC ASPHALTIC CONCRETE
BB BIT TREATED BASE
CB CEMENT TREATED BASE
RM ROAD MIX
SC ACSC
FC ACFC
SS SLURRY SEAL
EB EMULSIFIED ASPHALT
EF EMULSIFIED ASPHALT
ES EMULSIFIED ASPHALT
SURFACING

OTHER TYPE CODES:

NM PNEUMATICALLY
PLACED MORTOR
MS MEMBRANE SEAL
GR GROUT

LAB CODES:

C CENTRAL LAB
D DISTRICT LAB
P PROJECT LAB

RDWY CCDES:

NB NORTHBOUND
SB SOUTHBOUND, ETC
RA RAMP A
RB RAMP B, ETC.
FR FRONTAGE ROAD
XR CROSS ROAD

PURPOSE CODES:

A ACCEPTANCE
M MISCELLANEOUS
F FINAL
C CONTROL
P PROGRESS
I INFORMATION

AGGREGATE MATL CODES:

CA COARSE AGGREGATE (3,7,57,67,35)
FA FINE AGGREGATE (A,D,S,P,GR,NM)
RR RIP RAP (1,2,3)
AB AGGREGATE BASE (1,2,3)
SM SELECT MATERIAL (1,2,3,4,5,6)
CM COVER MATERIAL (3,8,10,11,MS)
MA MINERAL AGGREGATE (see MA type codes)

STOCKPILES

B BLEND SAND
F FINE STOCKPILE
I INTERMEDIATE S.P.
C COARSE STOCKPILE
K COARSEST STOCKPILE

HOT PLANT BINS

1 COMPOSITE OF BINS
1 BIN # 1
2 BIN # 2
3 BIN # 3

Specific Gravity and Absorption of Fine Aggregate

ARIZ 211

Bulk sp gr (O.D. basis) $\frac{A}{B + 500 - C} = \frac{A}{500 - \quad} = \quad$

where: A = mass of oven-dry sample in air, g.
B = mass of pycnometer filled with water, g, and
C = mass of pycnometer with sample and water to calibration mark, g.

Bulk sp. gr (SSD basis) $= \frac{500}{B + 500 - C} = \frac{500}{500 - \quad} = \quad$

Absorption, percent $\frac{500 - A}{A} \times 100 = \frac{500 - \quad}{\quad} \times 100 = \quad\%$

Specific Gravity and Absorption of Coarse Aggregate

ARIZ 211

Bulk sp gr (O.D. basis) $\frac{A}{B - C} = \frac{A}{\quad - \quad} = \quad$

where: A = mass of oven-dry sample in air, g.
B = mass of saturated-surface-dry-sample in air, g, and
C = mass of saturated sample in water, g.

Bulk sp gr (SSD basis) $\frac{B}{B - C} = \frac{\quad}{\quad - \quad} = \quad$

Absorption, percent $\frac{B - A}{A} = \frac{\quad - \quad}{\quad} \times 100 = \quad\%$

SAND READING _____ SAND READING _____ SAND READING _____
CLAY READING _____ CLAY READING _____ CLAY READING _____
SAND EQUIVALENT _____ SAND EQUIVALENT _____ SAND EQUIVALENT _____

AVERAGE SAND EQUIVALENT _____

EXAMPLE #4

MATERIALS SECTION
SOIL AND AGGREGATE TABULATION

LAB NUMBER: G 1 3 7
PROJ CODE: 1112
MATERIAL: EM
TYPE: B1
PURPOSE: I
LAB: P
SPEC: 1
SIZE: 19
SIZE: 20
SIZE: 21
TEST NO.: 22 23
LOT OR SUFFIX: 24 27
SAMPLED BY: 28 33
MO.: 34
DAY: 35
YEAR: 41
TIME: 42 43
LIFT NO.: 44 47
SAMPLED FROM: 49 53 63
ROWY: 64 65
STATION: 66 69 71
PLUS: 71
P = PIT
E = EXC.
ROWY: 72 73 74
STATION OR PIT NO.: 75 78 80
PROJECT NUMBER:
IF MILEPOST, INPUT DECIMAL IN COL. 59
I = IN PLACE
IF MILEPOST, INPUT DECIMAL IN COL. 78

REMARKS: G 2 EXAMPLE OF CALCULATIONS
WHEN ENTIRE SAMPLE IS WASHED
#4 SPLIT REQUIRED

KEY PUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards

% OVERSIZE ARIZ 201				COARSE FACTOR		CUMULATIVE % RET. FINENESS MODULUS
+ 3" O		+ 6" G				
LAB	TEST NO.	WEIGHTS RETAINED	% RET.	% PASS	SPECS.	
G 3	12	16				
	17	21				
	22	26				
	27	31				
	32	36				
	37	41	0	100		
	42	46	5	95		
	47	51	13	82		
	52	56	19	63		
	57	61	7			
	62	66	A → 56			
	67	71				
Total						

Liquid Limit (LL)	T - 89 O - 423	41	43
Plastic Limit (PL)	T - 90 O - 424	44	45
Plasticity Index (PI) = LL - PL	T - 90 O - 424	46	47
Abrasion (A, B, C, D.)	T - 96 C - 131	48	
≥ 100 Revolutions		49	50
≥ 500 Revolutions		51	52
Absorption, H ₂ O	ARIZ 211	53	54
Specific Gravity, SSD	ARIZ 211	57	60
Specific Gravity, OD	ARIZ 211	61	64

SPECS

T = AASHTO Tests
C & D = ASTM Tests

Sand Equivalent, SE = $\frac{S}{C} \times 100$	T - 176 O - 2419	63	64	≥ 75
--	---------------------	----	----	------

WT PASS #4 SPLIT			FINE SIEVE FACTOR		WASH WT = 46.79	
G	4	723 ⁰			ELUTX1 = 219	
ACCUMULATED WEIGHTS RETAINED			(no punch)	% RET.	% PASS	
#8	1 ¹³	67	13	43		
#10	14	52 ¹⁶	4	39		
#16	17	54 ¹	12	27		
#30	20	77 ²	6	21		
#40	23	78 ³	6	15		
#50	24	65 ⁵	5	10		
#100	25	32 ¹¹	3	7		
#200	32	25 ⁵	2			
#200	35	9 ⁷		5.2		
Total		665				
Elution		58				
TEST OPERATOR _____						

--- Example #4
continued

MATERIAL CODES FOR SOILS

6Q SUBGRADE
SB SPECIAL BACKFILL
SS SUBGRADE SEAL
NG NATURAL GROUND
BM BEDDING MATERIAL
FM FILTER MATERIAL
GR GRANULATED RUBBER
TS TOP SOIL
BF BACKFILL
EM EMBANKMENT
BL BLOTTER MATERIAL

MIN. AGG. (MA) TYPE CODES

AC ASPHALTIC CONCRETE
BB BIT TREATED BASE
CB CEMENT TREATED BASE
RM ROAD MIX
SC ACSC
FC ACFC
SS SLURRY SEAL
EB EMULSIFIED ASPHALT
 BASE COURSE
EF EMULSIFIED ASPHALT
 FRICTION COURSE
ES EMULSIFIED ASPHALT
 SURFACING

OTHER TYPE CODES:

NM PNEUMATICALLY
 PLACED MORTOR
MS MEMBRANE SEAL
GR GROUT

LAB CODES:

C CENTRAL LAB
D DISTRICT LAB
P PROJECT LAB

RDWY CODES:

NB NORTHBOUND
SB SOUTHBOUND, ETC
RA RAMP A
RB RAMP B, ETC.
FR FRONTAGE ROAD
XR CROSS ROAD

PURPOSE CODES:

A ACCEPTANCE
M MISCELLANEOUS
F FINAL
C CONTROL
P PROGRESS
I INFORMATION

AGGREGATE MATL CODES:

CA COARSE AGGREGATE (3,7,57,67,35)
FA FINE AGGREGATE (A,D,S,P,GR,NM)
RR RIP RAP (1,2,3)
AB AGGREGATE BASE (1,2,3)
SM SELECT MATERIAL (1,2,3,4,5,6)
CM COVER MATERIAL (3,8,10,11,MS)
MA MINERAL AGGREGATE (see MA type codes)

MIN. AGG. (MA) SIZE CODES:

STOCKPILES

B BLEND SAND
F FINE STOCKPILE
I INTERMEDIATE S.P.
C COARSE STOCKPILE
K COARSEST STOCKPILE

HOT PLANT BINS

8 COMPOSITE OF BINS
1 BIN # 1
2 BIN # 2
3 BIN # 3

Specific Gravity and Absorption of Fine Aggregate

ARIZ 211

Bulk sp gr $\frac{A}{B + 500 - C} = \frac{500}{+ 500 -}$ = _____
 (O.D. basis)
 where: **A** = mass of oven-dry sample in air, g.
 B = mass of pycnometer filled with water, g. and
 C = mass of pycnometer with sample and water to calibration mark, g.
 Bulk sp. gr $\frac{500}{B + 500 - C} = \frac{500}{+ 500 -}$ = _____
 (SSD basis)
 Absorption, percent $\frac{500 - A}{A} \times 100 = \frac{500 -}{\quad} \times 100 = \quad\%$

Specific Gravity and Absorption of Coarse Aggregate

ARIZ 211

Bulk sp gr = $\frac{A}{B - C} = \frac{-}{-}$ = _____
 (O.D. basis)
 where: **A** = mass of oven-dry sample in air, g.
 B = mass of saturated-surface-dry-sample in air, g. and
 C = mass of saturated sample in water, g.
 Bulk sp gr $\frac{B}{B - C} = \frac{-}{-}$ = _____
 (SSD basis)
 Absorption, percent $\frac{B - A}{A} = \frac{-}{\quad} \times 100 = \quad\%$

SAND READING _____ SAND READING _____ SAND READING _____

CLAY READING _____ CLAY READING _____ CLAY READING _____

SAND EQUIVALENT _____ SAND EQUIVALENT _____ SAND EQUIVALENT _____

AVERAGE SAND EQUIVALENT _____

EXAMPLE # 5

ARIZONA DEPARTMENT OF TRANSPORTATION
PROCTOR DENSITY
ARIZ. TESTS 220a, 225a, 226a, and 232a
(AASHTO T-99)

LAB NUMBER _____
RECEIVED DATE _____

NOTE: THE PURPOSE CODE IS "D" ON THE SAMPLE TABULATION.

c = Weight of Mold = _____ e = Volume Factor = 1.06545 D = 0.02939
A & C = 0.06614

a.	b.	d.	f.	MOISTURE DETERMINATION				
				g.	h.	i.	j.	
Approximate Percent of Water Added	Wet Weight of Mold & Sample	Wet Weight of Sample b - c	Wet Density lb/cu ft d x e	Wet Weight of Sample	Dry Weight of Sample	Weight of Water g - h	Percent Moisture $\frac{i}{h} \times 100$	Dry Density lb/cu ft $\frac{100 \times f}{(100 + j)}$
10%		1986	130.0	572	500	72	14.4	113.6
8%		1898	124.2	581	517	64	12.4	110.5
12%		1984	129.9	536	466	70	15.0	113.0
14%		1963	128.5	542	464	78	16.8	110.0

BULK SPECIFIC GRAVITY AND ABSORPTION
OF COARSE AGGREGATES (OVEN-DRY BASIS)
AASHTO T-85 and ASTM C-127

A = weight of oven-dry sample in air
B = weight of saturated-surface-dry sample in air
C = weight of saturated sample in water

$$\text{Sp. Gr.} = \frac{A}{B - C} = \frac{4982}{5058 - 3076}$$

$$G_s = \frac{2.51}{1} = 2.51$$

$$\text{Percent Absorption} = \frac{B - A}{A} \times 100$$

$$= \frac{5058 - 4982}{4982} \times 100 = 1.53$$

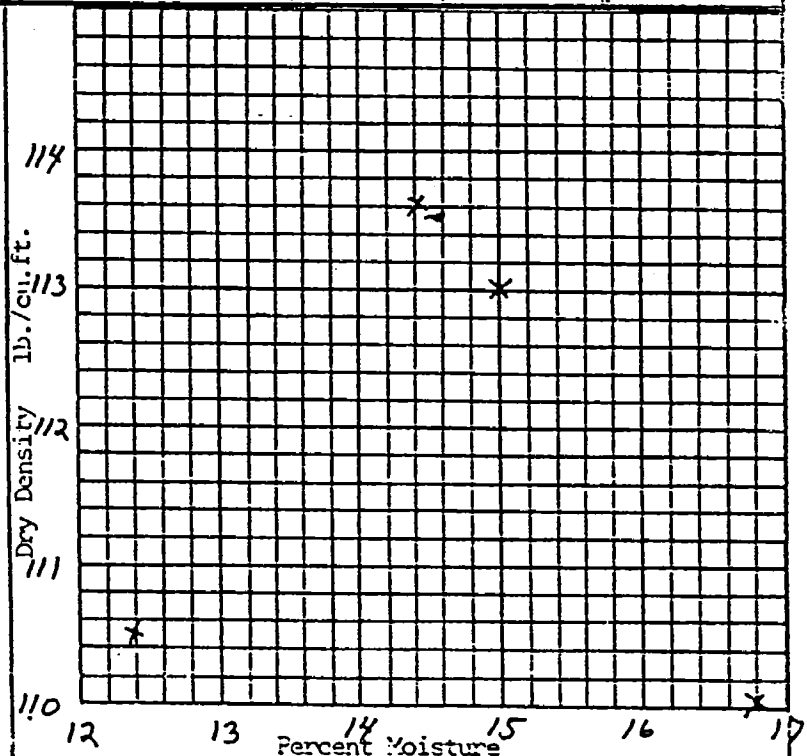
$$\text{Proctor Method (A, C, D, 1)} = \frac{A}{CC 18}$$

$$\text{Family of Curves \#} = \frac{CC 19-20}{1}$$

$$\text{Retained on \#4 Sieve} = \frac{3.0}{CC 21-24}$$

$$\text{Optimum Moisture} = \frac{14.6}{CC 25-28}$$

$$\text{Maximum Dry Density} = \frac{113.4}{\text{lb./cu.ft. CC 29-33}}$$



TESTED BY _____

ARIZONA DEPARTMENT OF TRANSPORTATION
ARIZ. TESTS 220a and 226a PROPORTIONING FORM

Perform the coarse sieve analysis in the usual manner but store the material retained on the 1/2", 3/8", 1/4", and #4 sieves in separate containers.

Rock retained on the 3/4" and larger sieves shall not be used, but its weight shall be distributed proportionately among the sieves mentioned above.

Use the following equations to proportion the material for the test charge:

$$D = C - B = \underline{\hspace{2cm}}$$

$$E = \frac{D}{D - A} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$F = \frac{G}{C} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

G = weight of sample charge; Method C, about 2200 g.,
and for Method D, about 5000 g. About 5000 g. for 220a.

$$H = E \times F = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

SIEVE SIZES	WEIGHTS RETAINED
2"	
1 1/2"	
1"	
3/4"	

Discard the material retained above.

A. TOTAL + 3/4"		MULTIPLY BY:	REPROPORTIONED WEIGHT EACH SIEVE	ACCUMULATIVE TOTAL WEIGHT
1/2"		H =		
3/8"		H = "		
1/4"		H = "		
#4		H = "		
B. PASS #4		F =		
C. TOTAL WEIGHT COARSE SIEVES				

TEST OPERATOR _____

EXAMPLE #5 CONTINUED

LAB NUMBER				PROJ CODE				MATL		TYPE		PURPOSE		TESTING LAB		SPEC		SIZE		SIZE							
G 1 0 0 1				1 1 1 2				S B		15		P		P		1				A							
TEST NO.				LOT OR SUFFIX		SAMPLED BY				MO.		DAY		YEAR		TIME											
2				27		R D 8 A S				0 8		0 4		8 4		0 9 1 5											
LIFT NO.		SAMPLED FROM																		RDWY		STATION		PLUS			
47		W B W I N G W A L L																		W 8		2 2 9		1 0			
P = PIT		ORIGINAL SOURCE																		RDWY		STATION OR PIT NO.		PROJECT NUMBER		IF MILEPOST, INPUT DECIMAL IN COL. 69	
E = EXC.		RDWY																		W 8		2 2 9		1 0		I X P - 0 8 4 - (0)	
I = IN PLACE		IF MILEPOST, INPUT DECIMAL IN COL. 73																									
REMARKS																											
G 2 C L A R K S T B R I D G E																											
G R A D A T I O N 8 P R O C T O R																											

KEYPUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards

MATERIAL CODES FOR ASPHALTIC MIXES

SC = A-L-W
 AC = ASPHALTIC CONCRETE
 FC = AC/C
 BD = BIT TREATED BASE
 RM = ROAD MIX
 EC = EMULSIFIED ASPHALT SURFACING
 CD = EMULSIFIED ASPHALT BASE COURSE
 CF = EMULSIFIED ASPHALT FINISH COURSE

TYPE CODES:

NC = RECYCLED MIX

MATERIAL CODES FOR SOILS

SG = SUBGRADE
 SB = SPECIAL BACKFILL
 SS = SUBGRADE SEAL
 NG = NATURAL GROUND
 DM = BEDDING MATERIAL
 FM = FILTER MATERIAL
 GR = GRANULATED RUBBER
 TS = TOP SOIL
 UF = BACKFILL
 CM = EMBANKMENT
 WL = UNDER MATERIAL

AGGREGATE MATERIAL CODES:

CA = COARSE AGGREGATE (3.75-7.5)
 FA = FINE AGGREGATE (0.075-4.75)
 NR = RIP RAP (1.25)
 AB = AGGREGATE BASE (1.25)
 SM = SELECT MATERIAL (1.25-4.75)
 CM = COVER MATERIAL (3.75-10.0)
 MA = MINERAL AGGREGATE (SEE MA TYPE CODES)

MIN. AGG. (MA) TYPE CODES

AC ASPHALTIC CONCRETE
 BD BIT TREATED BASE
 CB CEMENT TREATED BASE
 RM ROAD MIX
 FC AC/C
 SS SLURRY SEAL
 EB EMULSIFIED ASPHALT
 EC EMULSIFIED ASPHALT
 EF EMULSIFIED ASPHALT
 FC FINISH COURSE
 EC EMULSIFIED ASPHALT
 EF EMULSIFIED ASPHALT
 FC FINISH COURSE

MIN. AGG. (MA) SIZE CODES:

STOCKPILES
 1 BLEND SAND
 2 FINE STOCKPILE
 3 INTERMEDIATE S.P.
 4 COARSE STOCKPILE
 5 COARSEST STOCKPILE

HOT PLANT BINS

9 COMPOSITE OF BINS
 1 BIN#1
 2 BIN#2
 3 BIN#3

OTHER TYPE CODES:

NM PNEUMATICALLY
 PLACED MONITOR
 MS MEMBRANE SEAL
 GR GROUT

TESTING LAB CODES:

C CENTRAL LAB
 D DISTRICT LAB
 P PROJECT LAB

RDWY CODES:

ND NORTHBOUND
 SB SOUTHBOUND
 RA RAMP A
 RB RAMP B
 RC RAMP C
 RD RAMP D
 RE RAMP E
 RF RAMP F
 RG RAMP G
 RH RAMP H
 RI RAMP I
 RJ RAMP J
 RK RAMP K
 RL RAMP L
 RM RAMP M
 RN RAMP N
 RO RAMP O
 RP RAMP P
 RQ RAMP Q
 RS RAMP R
 RT RAMP T
 RU RAMP U
 RV RAMP V
 RW RAMP W
 RX RAMP X
 RY RAMP Y
 RZ RAMP Z

PURPOSE CODES:

A ACCEPTANCE
 M MISCELLANEOUS
 F FINAL
 C CONTROL
 P PROGRESS
 I INFORMATION

LAB NUMBER				PROJ CODE				MATERIAL		TYPE		PURPOSE		LAB		SPEC #		SIZE							
G	1		3	4	1	9	7	1	1	1	2	S	B			V	P	2							
TEST NO.				LOT OR SUFFIX				SAMPLED BY				MO.		DAY		YEAR		TIME							
			23				25																		
LIFT NO.				SAMPLED FROM																ROWY		STATION		PLUS	
1			47	B	O	T		R	E	T		W	A	L	L		B	A							
= FIT				ORIGINAL SOURCE																= EXC.		= IN PLACE		IF MILEPOST, INPUT DECIMAL IN COL. 69	
ROWY				STATION OR PIT NO.																PROJECT NUMBER					
E			22	F	R																				
= IN PLACE				IF MILEPOST, INPUT DECIMAL IN COL. 78																REMARKS				USE CAPITAL LETTERS	
																				IXF-084-(0)					

I = IN PLACE

IF MILEPOST, INPUT DECIMAL IN COL. 78

REMARKS

USE CAPITAL LETTERS!

						REMARKS	USE CAPITAL LETTERS!																	
G	2	F	A	I	L	E	D							20										33
34														48										61
62																								

KEYPUNCH INSTRUCTIONS: Duplicate thru 7 on all cards

KEYPUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards

3

TOTAL WET WEIGHT OF MATERIAL FROM THE HOLE				10	11	LB	a. RETAINED ON #4 = $\frac{B}{A} \times 100$				24	25	%			
WET WEIGHT OF MATERIAL RETAINED ON #4 SIEVE				12	25	13	LB	IF RETAINED ON #4 IS MORE THAN 50% (50%, IF AB), GO NO FURTHER								
WET WEIGHT OF MATERIAL PASSING THE #4 SIEVE = A - B				19	76	22	LB	E = $\frac{D(100 - a) + a}{100}$; if M > 4.00, E = $\frac{D(100 - a) + a \cdot M}{100}$								
MOISTURE OF THE MATERIAL PASSING THE #4 SIEVE				23	89	%										
MOISTURE CORRECTED FOR MATERIAL RETAINED ON #4				26	69	%	G 4									
VOLUMETER DENSITY							ONE POINT PROCTOR (ARIZ 232)									
FINAL				29	09	31	CF	b. WEIGHT OF MOLD & SOIL				8	11	LB		
BEGINNING				32	01	34	CF	c. WEIGHT OF MOLD				12	13	LB		
VOL. OF HOLE = F - G				35	08	37	CF	d. WEIGHT OF COMPACTED SOIL = h - c				16	19	LB		
WET DENSITY = $\frac{A}{H}$				38	11	41	PCF	e. WET DENSITY = d x 30				20	23	PCF		
DRY DENSITY = $\frac{I}{100 + E} \times 100$				42	11	45	PCF	f. WEIGHT OF WET SOIL				24	27	LB		
PROCTOR DENSITY							g. WEIGHT OF DRY SOIL							28	31	LB
PROCTOR NUMBER				46	5	8	2	h. WEIGHT OF WATER = f - g				32	34	LB		
PROCTOR METHOD (A, C, D, or 1)							A	MOISTURE CONTENT = $\frac{h}{g} \times 100$				35	37	%		
OPTIMUM MOISTURE				52	14	54	%	FAMILY OF CURVES NUMBER				38	39			
MAXIMUM DRY DENSITY				55	11	58	PCF	K. OPTIMUM MOISTURE				40	42	%		
ADJUSTMENT FOR RET. #4 & COMPACTION CALCULATION							L. MAXIMUM DRY DENSITY							43	46	PCF
ABSORPTION OF RET. #4 (AASHTO T-35 & ASTM C-127)				59	15	62	%	FOR METHOD A OR ONE-POINT ONLY								
SPECIFIC GRAVITY OF RET. #4 (OVEN DRY BASIS)				63	25	66		O = $\frac{K(100 - a) + a}{100}$; if M > 4.00, O = $\frac{K(100 - a) + a \cdot M}{100}$								
ADJUSTED OPTIMUM MOISTURE				67	11	69	%	P = $\frac{(100 - a)L + 56.2 \cdot a \cdot N}{100}$								
ADJUSTED MAX DRY DENSITY				70	12	73	PCF									
COMPACTION = $\frac{J}{P} \times 100$ OR $\frac{J}{L} \times 100$				74	92	77	%									
COMPACTION SPECIFICATION				78	95	%										

FOR METHOD A OR ONE-POINT ONLY

$$O = \frac{K(100 - a) + a}{100}; \text{ if } M > 4.00, O = \frac{K(100 - a) + aM}{100}$$

$$P = \frac{(100 - a) L + 56.2 a N}{100}$$

MATERIALS SERVICES

VOLUMETER DENSITY (ARIZ 231)

44-9348 R1/81

SITY TEST OPERATOR

CELT ENGINEER, PROJECT SUPERVISOR,
ABMAN

SAMPLE #6

MATERIALS SERVICES
SAND CONE DENSITY (ARIZ 230)

LAB NUMBER										PROJ CODE										MATL										TYPE										PUR-POSE										LAB										SPEC#										SIZE																			
G ¹ 1 ³ 7 ¹										1 ⁸ 1 ¹¹ 1 ¹¹ 2 ¹¹										E ²² M ¹³										14 ¹⁵										S ¹⁶										P ¹⁷										1 ¹⁸										19 ¹⁹										20 ²⁰ 21 ²¹									
TEST NO.										LOT OR SUFFIX										SAMPLED BY										MO.										DAY										YEAR										TIME																													
22 ²² 4 ²³										26 ²⁶ 27 ²⁷										R ²⁸ 1 ²⁹ R ³⁰ T ³¹ O ³² W ³³ 35 ³⁵										36 ³⁶ 0 ³⁷ 6 ³⁸ 1 ³⁹ 9 ⁴⁰ 8 ⁴¹ 4 ⁴²										43 ⁴³ 0 ⁴⁴ 7 ⁴⁵ 1 ⁴⁶ 5 ⁴⁷																																																	
LIFT NO.										SAMPLED FROM										RDWY										STATION										PLUS																																																	
48 ⁴⁸ 4 ⁴⁹										R ⁵⁰ A ⁵¹ M ⁵² P ⁵³ D ⁵⁴ 2 ⁵⁵ 5 ⁵⁶ ' L ⁵⁷ T ⁵⁸ 63 ⁶³										E ⁶⁴ B ⁶⁵										66 ⁶⁶ 7 ⁶⁷ 7 ⁶⁸ 8 ⁶⁹ 8 ⁷⁰ 0 ⁷¹																																																											
P= FIT E= EXC.										ORIGINAL SOURCE										PROJECT NUMBER										IF MILEPOST, INPUT DECIMAL IN COL. 69																																																											
RDWY										STATION OR PIT NO.										REMARKS										USE CAPITAL LETTERS!																																																											
E ⁷²										E ⁷³ B ⁷⁴ 7 ⁷⁵ 8 ⁷⁶ 1 ⁷⁷ 0 ⁷⁸ 0 ⁷⁹										I X F - 0 8 4 - (0)																																																																					
I= IN PLACE										IF MILEPOST, INPUT DECIMAL IN COL. 78																																																																															
G ⁸⁰ 2 ⁸¹ 8 ⁸²										20 ²⁰																				33 ³³																																																											
34 ³⁴										48 ⁴⁸																				61 ⁶¹																																																											
62 ⁶²																				80 ⁸⁰										KEYPUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards																																																											

6	3											
A. TOTAL WET WEIGHT OF MATERIAL FROM THE HOLE		1	1	0	8	LB						
B. WET WEIGHT OF MATERIAL RETAINED ON #4 ON SIEVE		12	3	7	7	LB	a. RETAINED ON #4 = $\frac{B}{A} \times 100$					
C. WET WEIGHT OF MATERIAL PASSING THE #4 SIEVE A - B		19	7	3	1	LB	3 4 0 %					
D. MOISTURE OF THE MATERIAL PASSING THE #4 SIEVE				8	7	%	IF RETAINED ON #4 IS MORE THAN 50% (60%, IF AB), GO NO FURTHER.					
E. MOISTURE CORRECTED FOR MATERIAL RETAINED ON #4				6	7	%	FOR METHOD A OR ONE-POINT ONLY					
F. WEIGHT OF SAND & CONTAINER BEFORE FILLING HOLE		1	5	1	6	LB	E = $\frac{D(100-a)+a}{100}$; IF Q > 4.00, E = $\frac{D(100-a)+aQ}{100}$					
G. WEIGHT OF SAND & CONTAINER AFTER FILLING HOLE			4	7	5	LB	ONE POINT PROCTOR (ARIZ 232)					
H. WEIGHT OF SAND TO FILL HOLE AND CONE F - G		1	0	4	7	LB	b. WEIGHT OF MOLD & SOIL		36		39	LB
I. WEIGHT OF SAND TO FILL CONE (lab tested)			3	5	5	LB	c. WEIGHT OF MOLD				43	LB
J. WEIGHT OF SAND TO FILL HOLE H - I			6	8	6	LB	d. WEIGHT OF COMPACTED SOIL				47	LB
K. DENSITY OF SAND (lab tested)			8	3	8	PCF	b - c					
L. VOLUME OF HOLE = $\frac{L}{K}$		0	8	1	9	CF	e. WET DENSITY d x 30				51	PCF
M. WET DENSITY = $\frac{A}{L}$		1	3	5	2	PCF	f. WEIGHT OF WET SOIL				55	LB
N. DRY DENSITY = $\frac{M}{100+E} \times 100$		1	2	7	6	PCF	g. WEIGHT OF DRY SOIL				59	LB
COMPACTION = $\frac{N}{T} \times 100$ OR $\frac{N}{P} \times 100$			9	6	9	%	h. WEIGHT OF WATER 1 - g				62	LB
COMPACTION SPECIFICATION						%	i. MOISTURE CONTENT $\frac{h}{g} \times 100$				63	%
						%	FAMILY OF CURVES NUMBER				67	
						%	O. OPTIMUM MOISTURE				70	%
8	4	PROCTOR DENSITY					P. MAXIMUM DRY DENSITY				74	PCF

8	4	PROCTOR DENSITY			
PROCTOR NUMBER					12
PROCTOR METHOD (A, C, D OR 1)					A ³
O. OPTIMUM MOISTURE					10.00
P. MAXIMUM DRY DENSITY					124.00 PCF

ADJUSTMENT FOR RET. #4 (METHOD A OR ONE-POINT ONLY)				
2. ABSORPTION OF RET. #4		1	0	24
3. SPECIFIC GRAVITY OF RET. #4	2	6	1	28
5. ADJUSTED OPTIMUM MOISTURE				31
7. ADJUSTED MAX DRY DENSITY	1	3	1	7

DENSITY TEST OPERATOR

RESIDENT ENGINEER, PROJECT SUPERVISOR,
OR LABMAN

FOR METHOD A OR ONE-POINT ONLY

$$S = \frac{0(100 - a) + a}{100}; \text{ if } Q > 4.00, S = \frac{0(100 - a) + aQ}{100}$$

$$T = \frac{P(100 - a) + 56.2 \text{ g R}}{100}$$

23R
EXAMPLE #7

Example #7
continued

ROWY CODES:

NB = NORTHBOUND
SB = SOUTHBOUND.
ETC.
RA = RAMP A
RB = RAMP B
ETC
FR = FRONTAGE ROAD
XR = CROSS ROAD

LAB CODE:

C = CENTRAL LAB
D = DISTRICT LAB
P = PROJECT LAB

MATERIAL CODES:

SG = SUBGRADE	EM = EMBANKMENT
SB = SPECIAL BACKFILL	CB = CEMENT TREATED BASE
SM = SELECT MATERIAL	TS = TOP SOIL
SS = SUBGRADE SEAL	BF = BACKFILL
NG = NATURAL GROUND	
BM = BEDDING MATERIAL	
AB = AGGREGATE BASE	

EXAMPLE #8

MATERIALS SECTION
ASPHALTIC CONCRETE TABULATION

RECEIVED DATE _____

LAB NUMBER: G 1 018
PROJ CODE: 1112
MATL: AC
TYPE: (34)
PUR-POSE: A
LAB: P
SPEC: 1
SIZE:
SIZE:
TEST NO.: 18
LOT OR SUFFIX:
SAMPLED BY: LAGUNA
DAY: 07
YEAR: 26
TIME: 83
LIFT NO.: 2
SAMPLED FROM: LEFT TURN BAY
ROWY: EB
STATION: 10285
PLUS:
P=FIT
E=EXC.
ORIGINAL SOURCE:
STATION OR PIT NO.:
PROJECT NUMBER: COLUMBIA IIR-084-0
IF MILEPOST, INPUT DECIMAL IN COL. 69
I=IN PLACE
IF MILEPOST, INPUT DECIMAL IN COL. 78

REMARKS: G 2 SPLIT TO LAB
3/4" MIX
RUN RICE TEST
KEYPUNCH INSTRUCTIONS: Duplicate col. 3 thru 7 on all cards

COARSE FACTOR	FINE FACTOR
8 3	

ARIZ-201	ACCUMULATED WEIGHTS RETAINED	% RET.	% PASS	SPECS
3"				
2 1/2"				
2"				
1 1/2"				
1"				
3/4"				
1/2"	221	9	91	98
3/8"	307	12	79	85
1/4"	201	8	71	76
3/16"	198	7	63	
1/8"	105	4		
1/16"	147			
Total	2509		59	

Total Dry Wt. of Pass #4 Split
1: $\frac{a \times c}{b} + d$

ARIZ-407	ACCUMULATED WEIGHTS RETAINED	% RET.	% PASS	SPECS
#8	117	9	50	45
#10				
#16				
#30				
#40	418	32	18	13
#50				
#100				
#200	177	14		
#200				
Total	712		3.7	4.1

W = DRY WEIGHT
1: $\frac{a \times c}{b} + d$
Asphalt Content Target Value

WHITE ☐
YELLOW ☐
BLUE ☐

ARIZ 402 or 413
EXTRACTION TEST

a. Wt. of Cells, filter and - #200: 178
b. Predetermined Wt. of Cells and Filter: 115
c. Dry Wt. of - #200 (a - b): 63
d. Dry Wt. of Extracted Agg.: 2446
e. Dry Wt. of Ext. Agg. and - #200 (c + d) (enter on 1 below and coarse sieve total): 2509
f. Trap Reading ARIZ 406: 23 5
g. Wt. of Moisture Sample: 500
h. Moisture Content $\frac{100 \times f}{g - f}$: 10
i. Initial Wt. of the AC Sample: 2640
j. Wt. of Water (h x 100): 3
k. Wt. of AC Less Water (i - j): 2637
l. Dry Wt. of Ext. Agg. and - #200 (e): 2509
m. Wt. of Ext. Asphalt (h - i): 128
n. Ext. Asphalt Content (m x 100): 4.85
o. Asphalt Retention Factor ARIZ 407: 12
p. Total Asphalt Content (n + o) PD: 4.97
q. O.D. Split Wt. of Pass #4: 728
r. Dry Wt. of Pass #4: 7414
ASHTO T-202
Add. Visc: 74
S 140°F

ARIZ 617 d
VOIDS ANALYSIS

C = Core
M = Marshall
H = Hveem
A
Pav = Asphalt Absorption (% of O.D. aggregate): 58
Gc = Asphalt Sp. Gr. (AASHTO T-228): 10208
Gc = Coarse Agg. Sp. Gr. (AASHTO T-85): 2554
Gf = Fine Agg. Sp. Gr. (Ariz 211): 2578
Mineral Admixture (Lime, Cement, Po. Sp): C
Pav = Min. Admixture Content (% of Mineral Agg.): 20
Gmb = Comb. Agg. Bulk O.D. Sp. Gr.: 2566
Gmb = AC Mix Dry Bulk Sp. Gr. (AASHTO T-166): 2286
VMA = Voids in the Mineral Aggregate: 157
EV = Air Voids: 57
VF = Voids Filled: 638
Grav = Sample Mass Sp. Gr. = $\frac{100 \times Gmb}{100 - EV}$ FOR RICE TEST, AND SO: 2424
Sample Mass Dens. (Grav x 62.3): 1510
AC Mix Bulk Dens. (Grav x 62.3): 1424
Stability:
Consolidation or Flow:
1: $\frac{a \times c}{b} + d$

TEST OPERATOR _____

LABOR PROJECT SUPERVISOR OR RESIDENT ENGINEER _____

EXAMPLE #8 CONTINUED

BULK SPECIFIC GRAVITY OF COMPACTED BITUMINOUS MIXTURES

AASHTO T-166

TESTS PERFORMED & OPERATOR

SPECIMEN MOLDED BY

MARSHALL ☒ HVEEM ☐ CORE ☐

PROCEDURE METHOD

B ☐ C ☐

SPECIMEN HEIGHTS

= 2 9/16" 2 1/2" 2 1/2"

A mass in grams of sample in air

= 1163.8 1165.9 1164.8

B mass in grams of SSD sample in air

= 1164.6 1165.7 1165.7

C mass in grams of sample in water

= 651.2 658.7 657.4

$\frac{A}{B - C}$

= 1163.8 1165.9 1164.8
513.4 507.0 508.3

Bulk Specific Gravity

= 2.267 2.300 2.292

Average = 2.286

Marshall Stability Reading

=

Corrected Marshall Stability

=

Average =

Marshall Flow Reading

=

Average =

$$G_{sb} = \frac{100}{\frac{100 - P_b}{G_c} + \frac{P_b}{G_f}} = \frac{100}{\frac{100 - 5.9}{2.554} + \frac{5.9}{2.574}} = 2.566$$

$$P_{ma} = \frac{(100 - P_b)}{1.00 + (0.01 \times P_{ad})} = \frac{100 - 4.97}{1.00 + (0.01 \times 2.0)} = 93.17$$

$$P_{mu} = 100 - P_b - P_{ma} = 100 - 4.97 - 93.17 = 1.86$$

$$V_{ag} = \frac{P_{ma} \times G_{mb}}{G_{sb}} = \frac{93.17 \times 2.286}{2.566} = 83.0$$

$$V_{mu} = \frac{P_{mu} \times G_{mb}}{G_{ad}} = \frac{1.86 \times 2.286}{3.14} = 1.35$$

$$P_{be} = P_b - (P_{da} \times P_{ma} \times 0.01) = 4.97 - (5.9 \times 93.17 \times 0.01) = 4.43$$

$$V_{de} = \frac{P_{be} \times G_{mb}}{G_o} = \frac{4.43 \times 2.286}{1.0208} = 9.92$$

$$VMA = 100 - V_{ag} - V_{mu} = 100 - 83 - 1.35 = 15.65$$

$$EV = VMA - V_{de} = 15.65 - 9.92 = 5.73$$

$$VF = \frac{V_{de}}{VMA} \times 100 = \frac{9.92}{15.65} \times 100 = 63.39$$

$$\begin{aligned} G_{ad} &= 3.14 \\ \text{CEMENT} &= 3.14 \\ \text{LIME} &= 2.20 \\ \text{SP CEMENT} &= 3.00 \end{aligned}$$

RDWY CODES:

NS = NORTHBOUND
SB = SOUTHBOUND
ETC.
RA = RAMP A
RB = RAMP B
ETC.
FR = FRONTAGE ROAD
XR = CROSS ROAD

PURPOSE CODES:

A = ACCEPTANCE
M = MISCELLANEOUS
F = FINAL
C = CONTROL
P = PROGRESS
I = INFORMATION

LAB CODE:

C = CENTRAL LAB
D = DISTRICT LAB
P = PROJECT LAB

MATERIAL CODES:

SC = ACSC
AC = ASPHALTIC CONCRETE
FC = ACFC
BB = BIT TREATED BASE
RM = ROAD MIX
ES = EMULSIFIED ASPHALT SURFACING
EB = EMULSIFIED ASPHALT BASE COURSE
EF = EMULSIFIED ASPHALT FRICTION COL

TYPE CODES:

RC = RECYCLED MIX

EXAMPLE #9

***** ADOT PROJECT MATERIALS UTILITY PROGRAM *****

PROJECT CODE
1112

PROJECT NUMBER
IXF-084-(0)

PROJECT NAME
***** TEST PROJECT *****

LOT # = 3 DATE = 071684 TIME = 17:29 GAUGE NO. =

LOCATIONS FOR SECTION # 1

TEST #	STATION	OFFSET	(DATA VALUES)
1	97+69	-12.1	_____
2	98+59	-10.6	_____
3	100+38	-17.5	_____
4	103+82	-11.3	_____
5	104+81	-11.2	_____
6	104+85	-14.7	_____
7	105+35	-14.3	_____
8	106+13	-16.8	_____

BEGINNING STA. = 95+50 ENDING STA. = 107+50
 AREA IN SECTION = 1333.333 SQ.YD. APX. TONNAGE = 205.34
 MAT WIDTH = 10 FT. APX. DEPTH = 3 IN.
 MAT STATUS LEFT = UNCONFINED RIGHT = CONFINED
 PLACED IN EB RDWY, LIFT #1, 16 FT. LT OF C/L

APX. AREA COVERED BY LOT = 1333.333 SQ. YD.
 APX. TONS IN LOT = 205.3425 TONS

EXAMPLE #9

EXAMPLE #9
CONTINUED

ARIZONA DEPARTMENT OF TRANSPORTATION
NUCLEAR DENSITY TEST REPORT

☐ Test Strip

☒ Lot Specification Compliance

Date 07-16-84 Project No. TXF-084-(0) Operator DWP Material AC 3/4 #1
Gauge Model No. 3411-D Gauge Serial No. 7079 % Asphalt in Mix _____ Lot/Test Strip No. 3
Ribbon No. 1 Lift No. 1 Roadway Lane EB-16' LT Mat Depth 3 in.

No. of Roller Coverages _____

					Avg.
Daily Standard Counts	Density				2826
	Moisture				408

Time 9:00
Rubbertire 1
Vibratory 2
Static 2
Mat Temp. 265°

Station 95+50 to 107+50
_____ to _____
_____ to _____

Total Length 1200 ft.
Mat Width 10 ft.

Wet Density 1 (3400)	Avg. Wet Density (3400)
Wet Density 2	
or	or

% Moisture (3400)
or

Correction Factor from Cores (±) = +2.9

Laboratory Mix Design Density (Ariz 815) = 144.1

Test No.	Random No. 1	Station Dist.	Station	B. S. Count 1 (2400)	Avg. B.S. Count (2400)	Count Ratio	Density (2400)	Corr. Density	% of Lab Mix Design Density	(% Density) - (Avg. % Density)	[(% Density) - (Avg. % Density)] ²
1			97+69 -12.1	138.6 137.0	137.8			140.7	97.6		
2			98+59 -10.6	134.9 134.2	134.6			137.5	95.4		
3			100+38 -17.5	134.8 135.0	134.9			137.8	95.6		
4			103+82 -11.3	137.6 137.6	137.6			140.5	97.5		
5			104+81 -11.2	SKIP							
6			104+85 -14.7	134.3 131.1	133.0			135.9	94.3		
7			105+35 -14.3	138.0 134.7	136.4			137.3	96.7		
8			106+13 -16.8	137.0 135.7	136.4			139.3	96.7		
(Σ = sum)				Σ =	950.7	Σ =		Σ =	673.8	Σ =	
(Avg. = Σ/n)				Avg. =	118.8	Avg. =		Avg. =	84.2		

$$\text{Standard Deviation (s)} = \sqrt{\frac{\sum (\% \text{ Density} - \text{Avg. \% Density})^2}{n-1}} = \sqrt{\frac{35}{6}} = 1.21$$

$$\text{Specified \% Density} = 95.0 \quad \text{Quality Index (Q)} = \frac{(\text{Avg. \% Density}) - (\text{Specified \% Density})}{(s)} = \frac{96.3 - 95.0}{(1.21)} = 1.074$$

% of Lot Within Tolerance (From Mod. Table 406-B on Back) = 86.90

Remarks: _____

Resident Engineer _____ Date EXAMPLE #9

NUCLEAR GAUGE/CORE CORRECTION FACTOR

TESTED BY _____ DATE _____ TEST STRIP NO. _____

Specific Gravity of Cores by Ariz 415, Method C:

A = mass in grams of sample of air (oven dried)
B = mass in grams of S.S.D. sample in air
C = mass in grams of sample in water

$$\text{Specific Gravity} = \frac{A}{B - C}$$

Test No.	Station	A	B	C	Specific Gravity
1					
2					
3					
4					
5					
6					
7					
$\Sigma =$					
Avg. =					

Avg. Core Density = Avg. Specific Gravity x 62.3 = _____ lb/cu. ft.

Laboratory Mix Design Density (Ariz 815) = _____ lb/cu. ft.

% Compaction for Avg. Core Density = $\frac{\text{Avg. Core Density}}{\text{Lab Density (Ariz 815)}} \times 100 = \text{ } \%$

Avg. Nuclear Gauge Density = _____ lb/cu. ft.

Correction Factor from Cores (\bar{C}) = (Avg. Core Density) - (Avg. Nuclear Gauge Density) = _____

Modified Table 406-6 (N=7)		
% of Lot Within Tolerance		
O > O	Positive or Negative Values of O	O < O
100.	1.983 or More	0.
99.	1.819 - 1.982	1.
98.	1.711 - 1.818	2.
97.	1.625 - 1.710	3.
96.	1.552 - 1.624	4.
95.	1.488 - 1.551	5.
94.	1.427 - 1.485	6.
93.	1.372 - 1.426	7.
92.	1.321 - 1.371	8.
91.	1.272 - 1.320	9.
90.	1.227 - 1.271	10.
89.	1.183 - 1.226	11.
88.	1.140 - 1.182	12.
87.	1.100 - 1.139	13.
86.	1.060 - 1.099	14.
85.	1.022 - 1.059	15.
84.	1.985 - 1.021	16.
83.	0.949 - 0.984	17.
82.	0.914 - 0.946	18.
81.	0.879 - 0.913	19.
80.	0.846 - 0.878	20.
79.	0.813 - 0.845	21.
78.	0.780 - 0.812	22.
77.	0.748 - 0.779	23.
76.	0.716 - 0.747	24.
75.	0.685 - 0.715	25.
74.	0.655 - 0.684	26.
73.	0.625 - 0.654	27.
72.	0.595 - 0.624	28.
71.	0.565 - 0.594	29.
70.	0.536 - 0.564	30.
69.	0.507 - 0.535	31.
68.	0.478 - 0.506	32.
67.	0.450 - 0.477	33.
66.	0.421 - 0.449	34.
65.	0.393 - 0.420	35.
64.	0.365 - 0.392	36.
63.	0.338 - 0.364	37.
62.	0.310 - 0.337	38.
61.	0.283 - 0.309	39.
60.	0.255 - 0.282	40.
59.	0.228 - 0.254	41.
58.	0.201 - 0.227	42.
57.	0.174 - 0.200	43.
56.	0.147 - 0.173	44.
55.	0.120 - 0.146	45.
54.	0.094 - 0.119	46.
53.	0.067 - 0.093	47.
52.	0.040 - 0.066	48.
51.	0.013 - 0.039	49.
50.	0.000 - 0.012	50.

Remarks: _____

EXAMPLE #15 ARIZONA DEPARTMENT of TRANSPORTATION MATERIALS SERVICES

CLASS "S" STRUCTURAL CONCRETE MIX DESIGN
Tucson-Mogilas Highway

PROJECT NUMBER IXE-084-(6) PROJECT NAME TEST PROJECT
GENERAL
CONTRACTOR: LIGHTNING CONSTRUCTION CONCRETE SUPPLIER San Xavier Rock & Mat.
MIX DESIGN DATE: 4/23/84 DESIGNED BY: David N. Cripe Q. C. Manager
ADCT ITEM #503005 Design Strenght 3000 psi at 28 Days
CEMENT TYPE: Type II Low Alakli SOURCE: Phoenix Cement Clarkdale Az.
POZZOLAN TYPE: Class "F" SOURCE: Western Ash Co.
FINE AGGREGATE P.M.: SOURCE: Santa Cruz River
COARSE AGGREGATE ASBHTC SIZE DESIGNATION: #57
C.A. # 1 100 % 1 1/2" INCH MAX. SIZE SOURCE: Santa Cruz River
C.A. # 2 5 % 3/4" Inch Max. Size SOURCE: Santa Cruz River
AIR ENTRAINING AGENT TYPE: None SOURCE: WRDA 79
WATER REDUCING AGENT TYPE: 6 oz/cwt SOURCE: WR Grace Co. Cambridge, Mass.
OTHER ADMIXTURE TYPE: None SOURCE:

CONCRETE SUPPLIERS PRODUCT CODE 3732

MATERIAL	WEIGHT/YD	SPECIFIC GRAVITY	VOLUME CU.FT./CUBIC YARD
CEMENT:	<u>480</u> LBS	<u>3.15</u>	<u>2.44</u> Ft ³
POZZOLAN CLASS "F"	<u>110</u> LBS	<u>2.30 (15% @ 1.30)</u>	<u>.77</u> Ft ³
WATER	<u>285</u> LBS	<u>1.00 (34.2 GAL)</u>	<u>4.47</u> Ft ³
FINE AGGREGATE	<u>1317</u> LBS(SSD)	<u>2.59</u>	<u>8.15</u> Ft ³
C.A. # 1	<u>1745</u> LBS(SSD)	<u>2.59</u>	<u>10.80</u> Ft ³
C.A. # 2	<u></u> LBS(SSD)	<u></u>	<u></u> Ft ³
AIR CONTENT	<u>1</u> % (entrapped)	ADOT - MATERIALS SERVICES	<u>.27</u> Ft ³
OTHER ADMIXTURE	<u>None</u>	APPROVAL OF THIS MIX DESIGN	<u></u> Ft ³
TOTALS	<u>3037</u> LBS	SHALL NOT RELIEVE THE	<u>-0-</u> Ft ³
		CONTRACTOR OF FULL RESPON-	<u></u> Ft ³
		SIBILITY FOR THE RESULTS	<u></u> Ft ³
		OBTAINED.	<u>27.00</u> Ft ³

SLOPE: 3.5" INCHES

APPROVED BY: George Lewis 6-4-84

SUBMITTED BY: [Signature]

DATE: April 27, 1984

APPROVED BY: [Signature]

DATE:

Sworn to before me this 27th day of April, 1984, personally appeared
David N. Cripe of San Xavier Rock & Mat.

Commission Expires: 7/11/86

This mix design has been previously approved on A.D.O.T. project

EXAMPLE #11

☐ WHITE ☐ YELLOW ☐ BLUE

MATERIALS SECTION
CONCRETE TEST REPORT

KEYPUNCH INSTRUCTIONS:
COLUMNS 3 THROUGH 16 ARE DUPLICATED
ON CARDS K2 THROUGH K7

#1

PROJECT CODE	CLASS	CORE BEAM OR CYLINDER #1	CORE BEAM OR CYLINDER #2	DATE BATCHED	TICKET NUMBER	TRUCK OR BATCH QUANTITY	TRUCK NO.
111125	5			090284	1000	8.5 CY	36541
ANT. OF AIGIN OR PIT	SAM XAVIER						
PROJECT NUMBER	IXF-084-(0) - 1112						

AT PLANT

K 2	DESIGN W/C LB/CY	MOISTURE ± 5% D. LB/CY	BATCH WEIGHTS LB/CY	FLY ASH LB/CY	TYPE	AMOUNT	Max. mfg. rated mix speed
CEMENT	480			110	W R D A 79	35	18 rpm
SAND	1317	60	1401				6 rpm
C.A. #1	1745						12 rpm
C.A. #2							6 min
WATER	285	84	201				No. of rev. 172

INSPECTOR'S SIGNATURE

K 3	DATE SAMPLED	SAMPLED BY	QTY IN STRUC REP BY TEST	WATER ADD LB/CY	SAMPLE TIME
090284	ZZZZ	500		0900	
DIR	STATION	PLACED IN - PART OF STRUCTURE	STRUCT. NO.	Additional Mix time	
EB	100 + 00	FL00R	14	Time mixed at plant	
K 4	ENTRAINED AIR SPEC	TO	IF NO BATCH WEIGHTS, THERE IS NO FINAL W/C RATIO	CONCRETE TEMP	Total time mixed plant and site
	ENTRAINED AIR CONTENT		FINAL W/C RATIO	84	Mix rev. at Plant
	SLUMP SPEC	TO 450	MAX W/C RATIO	100	Mix Rev. at Site
	MEASURED SLUMP	400			Total No. of Mix Rev. at Plant & Site

INS. FIELD INSPECTOR'S SIGNATURE

LAB NUMBER #5

AT LAB

NOTE: FOR SCHMIDT HAMMER TEST INPUT THE REQUIRED VALUE IN 64-65; INPUT THE TEST VALUE IN 72-73

K 5	REC'D DATE	AGE	H = HOURS D = DAYS	BEAM OR CYLINDER	LOAD	STRESS
	17	70	D	AVE. WIDTH OR DIA. 415	8802	1945
	TIME REC'D IN LAB	REQUIRED STRENGTH		AVE. DEPTH		
	TEST DATE	1785		LENGTH		

AVERAGE

LAB NUMBER #5

AT LAB

NOTE: FOR SCHMIDT HAMMER TEST INPUT THE REQUIRED VALUE IN 64-65; INPUT THE TEST VALUE IN 72-73

K 6	REC'D DATE	AGE	H = HOURS D = DAYS	BEAM OR CYLINDER	LOAD	STRESS
	17	280	D	AVE. WIDTH OR DIA. 415	15477	3420
	TIME REC'D IN LAB	REQUIRED STRENGTH		AVE. DEPTH	15994	3496
	TEST DATE	3000		LENGTH		

AVERAGE

LAB CODES: P = PROJECT D = DISTRICT C = CENTRAL

AT LAB

USE CAPITAL LETTERS!

K 7	REMARKS	USUAL ITEM NO. FOR STRENGTH CODE
		5 = 3000 PSI
		6 = 3500 PSI
		7 = 4000 PSI
		8 = 4500 PSI

BSMAN (7-DAY) SIGNATURE

LABMAN (28-DAY) SIGNATURE

ORIGINAL COPY TO LAB
CARBON COPY TO PROJECT FILE
NO COPIES SHOULD BE KEPT AT BATCH PLANT

NOTE: SPACES 3 THROUGH 16 MUST BE COMPLETE ON K1 LINE

EXAMPLE #16

COMPOSITE GRADING (An Arizona Method)

Scope

1. This is a method of combining, in suggested percentages, two or more samples of different gradations to produce a final product of composited gradation.

Procedure

2. (a) An example of a sieve analysis, as reported from ARIZ 201, for four individual samples is shown in Figure 1. The sieve analysis report is given for accumulative weight retained, percent retained and percent passing each sieve size.

(b) For each sample; multiply the percent retained on each sieve by the "decimal % of composite" for the sample.

(c) Add the resultant percentages retained on each sieve for all samples and record as the composite % retained. Round the % retained for each sieve to the nearest 1%, except the amount passing the No. 200 sieve shall be reported to the nearest 0.1%.

NOTE: In the case of the above calculation rendering a result to exactly one half of a percent, the following rule of rounding will be applied: If the number preceeding the decimal point is odd the number is increased by 1, if the number is even it is left unchanged.

NOTE: Figure 2 shows an example of the calculations described in paragraphs (b), (c) and (d), and a completed composite grading of the four individual samples.

(d) To obtain the composite percent passing each sieve, start with the Pass No. 200 fraction (rounded to the whole percent), in the example 31; and add the percent retained on the No. 200 sieve (31), and record the sum as the % Passing the No. 100 sieve (61). Add the % retained on the No. 100 sieve to this total and record as the % passing the No. 50 sieve (6 + 8 = 14). Repeat this operation for all sieves, the final value should be 100%.

NOTE: If it is preferred, the % passing each sieve may be determined by beginning with the largest sieve which has material retained, in the example 15% was retained on the 1/2" sieve; subtract the % retained from 100 and record as %

passing (100 - 15 = 85); subtract the % retained on the next smaller sieve and record as % passing (85 - 11 retained on the 3/8 = 74); Continue this procedure for all sieves, the final value should be the percent passing the No. 200 sieve, rounded to the whole percent.

NOTE: If a calculated composite is desired using the percent passing each sieve, it may be obtained by multiplying the % pass each sieve by the "decimal % of composite" for each sample, and accumulate for the resultant composite percent pass each sieve in similar manner as in the method described above for composite % retained. After the composite % passing each sieve is calculated the composite % retained is determined by the following:

$$\% \text{ Retained on Individual Sieve} - \left[\begin{array}{c} \% \text{ Passing} \\ \text{next larger} \\ \text{sieve size} \end{array} \right] = \left[\begin{array}{c} \% \text{ Passing} \\ \text{desired} \\ \text{sieve size} \end{array} \right]$$

An example using the % passing method is illustrated in Figure 3.

EXAMPLE #18 CONTINUED

SAMPLE #1										SAMPLE #2										SAMPLE #3										SAMPLE #4									
OVERSIZE 1" 1/2" 1" 3/4" 1" 1/2" 1" 1/4" 3/4" 1/2" 1/4" 1/2" 1/4" 1/8" 1/16" 1/32" 1/64" 1/128" 1/256" 1/512" 1/1024" 1/2048" 1/4096" 1/8192" 1/16384" 1/32768" 1/65536" 1/131072" 1/262144" 1/524288" 1/1048576" 1/2097152" 1/4194304" 1/8388608" 1/16777216" 1/33554432" 1/67108864" 1/134217728" 1/268435456" 1/536870912" 1/1073741824" 1/2147483648" 1/4294967296" 1/8589934592" 1/17179869184" 1/34359738368" 1/68719476736" 1/137438953472" 1/274877906944" 1/549755813888" 1/1099511627776" 1/2199023255552" 1/4398046511104" 1/8796093022208" 1/17592186044416" 1/35184372088832" 1/70368744177664" 1/140737488355328" 1/281474976710656" 1/562949953421312" 1/1125899906842624" 1/2251799813685248" 1/4503599627370496" 1/9007199254740992" 1/18014398509481984" 1/36028797018963968" 1/72057594037927936" 1/144115188075855872" 1/288230376151711744" 1/576460752303423488" 1/1152921504606846976" 1/2305843009213693952" 1/4611686018427387904" 1/9223372036854775808" 1/18446744073709551616" 1/36893488147419103232" 1/73786976294838206464" 1/147573952589676412928" 1/295147905179352825856" 1/590295810358705651712" 1/1180591620717411303424" 1/2361183241434822606848" 1/4722366482869645213696" 1/9444732965739290427392" 1/18889465931478580854784" 1/37778931862957161709568" 1/75557863725914323419136" 1/151115727451828646838272" 1/302231454903657293676544" 1/604462909807314587353088" 1/1208925819614629174706176" 1/2417851639229258349412352" 1/4835703278458516698824704" 1/9671406556917033397649408" 1/19342813113834066795298816" 1/38685626227668133590597632" 1/77371252455336267181195264" 1/154742504910672534362390528" 1/309485009821345068724781056" 1/618970019642690137449562112" 1/1237940039285380274899124224" 1/2475880078570760549798248448" 1/4951760157141521099596496896" 1/9903520314283042199192993792" 1/19807040628566084398385987584" 1/39614081257132168796771975168" 1/79228162514264337593543950336" 1/158456325028528675187087900672" 1/316912650057057350374175801344" 1/633825300114114700748351602688" 1/1267650600228229401496703205376" 1/2535301200456458802993406410752" 1/5070602400912917605986812821504" 1/10141204801825835211973625643008" 1/20282409603651670423947251286016" 1/40564819207303340847894502572032" 1/81129638414606681695789005144064" 1/162259276829213363391578010288128" 1/324518553658426726783156020576256" 1/649037107316853453566312041152512" 1/1298074214633706907132624082305024" 1/2596148429267413814265248164610048" 1/5192296858534827628530496329220096" 1/10384593717069655257060992658440192" 1/20769187434139310514121985316880384" 1/41538374868278621028243970633760768" 1/83076749736557242056487941267521536" 1/166153499473114484112975882535043072" 1/332306998946228968225951765070086144" 1/664613997892457936451903530140172288" 1/1329227995784915872903807060280344576" 1/2658455991569831745807614120560689152" 1/5316911983139663491615228241121378304" 1/10633823966279326983230456482242756608" 1/21267647932558653966460912964485513216" 1/42535295865117307932921825928971026432" 1/85070591730234615865843651857942052864" 1/170141183460469231731687303715884105728" 1/340282366920938463463374607431768211456" 1/680564733841876926926749214863536422912" 1/1361129467683753853853498429727072845824" 1/2722258935367507707706996859454145691648" 1/5444517870735015415413993718908291383296" 1/10889035741470030830827987437816582766592" 1/21778071482940061661655974875633165533184" 1/43556142965880123323311949751266331066368" 1/87112285931760246646623899502532662132736" 1/174224571863520493293247799005065324265472" 1/348449143727040986586495598010130648530944" 1/696898287454081973172991196020261297061888" 1/1393796574908163946345982392040522594123776" 1/2787593149816327892691964784081045188247552" 1/5575186299632655785383929568162090376495104" 1/11150372599265311570767859136324180752990208" 1/22300745198530623141535718272648361505980416" 1/44601490397061246283071436545296723011960832" 1/89202980794122492566142873090593446023921664" 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Sieve Size	SAMPLE #1 X of Composite = 23% Z Ret.		SAMPLE #2 X of Composite = 20% Z Ret.		SAMPLE #3 X of Composite = 27% Z Ret.		SAMPLE #4 X of Composite = 30% Z Ret.		COMPOSITE Z Ret. Rounded		% Pass
	X Ret.	% Ret.	X Ret.	% Ret.	X Ret.	% Ret.	X Ret.	% Ret.	Z Ret.	% Ret.	
3/4	0		0						0		100
1/2	55	12.6	10	2.0					12.6	13	87
3/8	40	9.2	48	9.6					11.2	11	76
1/4	4	0.9	27	5.4					10.8	11	65
#4	1	0.2	12	2.4	x.27	0.3			8.0	8	57
#8			1	0.2	x.27	2.4			11.7	12	45
#16			1	0.2	x.27	8.1			3.2	3	42
#30			0		x.27	2.7	x.30	1.2	7.1	7	35
#40			0		x.27	5.1	x.30	0.3	8.3	8	27
#50			0		x.27	3.2	x.30	1.8	6.2	6	21
#100			0		x.27	0.8	x.30	5.4	7.1	7	14
#200			0		x.27	0.0	x.30	6.3	8.0	8	6
			0		x.27	1.1	x.30	6.9	2.6	3	3.1
			0		x.27	0.5	x.30	2.1	3.1	3	-
			0.8	0.2	x.27	1.9	x.30	1.0	99.9	100.1	
Total*	100	22.9	99.8	20	26.9	100.3	30.1				

*The totals should be equal to, or be able to be rounded to the appropriate total X retained (individual samples, percent retained = 100; individual samples, total of resultant values from multiplying each sieve by the "X of Composite" = X of composite; composite, X Ret. and Z Ret. Rounded = 100)

NOTE: An adjustment may be necessary in the composite gradation due to the accumulation of "tenths of a percent" rendering a % retained and % retained rounded that does not sum to 100.

FIGURE 2

Sieve Size	SAMPLE #1		SAMPLE #2		SAMPLE #3		SAMPLE #4		COMPOSITE		
	Z of Composite = 23%		Z of Composite = 20%		Z of Composite = 27%		Z of Composite = 30%		Z Pass	Z Rounded	Z Ret.
	X Pass	X Pass	X Pass	X Pass	X Pass	X Pass	X Pass	X Pass	X Pass	X Pass	X Ret.
3/4	100	x.23	100	x.20	100	x.27	100	x.30	100.0	100	0
1/2	45	x.23	100	x.20	100	x.27	100	x.30	87.4	87	13
3/8	5	x.23	90	x.20	100	x.27	100	x.30	76.2	76	11
1/4	1	x.23	42	x.20	99	x.27	100	x.30	65.3	65	11
#4			15	x.20	90	x.27	100	x.30	57.3	57	8
#8			3	x.20	60	x.27	96	x.30	45.6	46	11
#10			2	x.20	50	x.27	95	x.30	42.4	42	4
#16			1	x.20	31	x.27	89	x.30	35.3	35	7
#30			1	x.20	19	x.27	72	x.30	26.9	27	8
#40			1	x.20	16	x.27	54	x.30	20.7	21	6
#50			1	x.20	13	x.27	33	x.30	13.6	14	7
#100			1	x.20	9	x.27	10	x.30	5.6	6	8
#200			0.8	x.20	6.9	x.27	3.3	x.30	3.1	3.1	3

FIGURE 3

APPENDIX E

TEST PROJECT - REPORT SAMPLES

WEEKLY MATERIALS LOG
 PROJECT # 111-004-(0)
 RE/SUPERVISOR - MR T
 MATERIAL - FEMINENT MATERIAL
 TEST DATE SAMPLED TIME
 DV

ARIZONA DEPARTMENT OF TRANSPORTATION
 OCTOBER 30, 1985
 NAME - TEST PROJECT
 CONTRACTOR - LIGHTNING CONSTRUCTION

PURPOSE - INFORMATIONAL
 ORIGINAL 3" 1" 3/8" #4 #100 #200 PI
 SOURCE X X X X X X X X X X

TEST #	DATE	SAMPLED FROM	188+50	100	100	76	43	9	4.6	16
1	07/21	J JONES 12:12 20' LT C/L								
Remarks for example soil and aggregate test #1.										
6	07/21	J JONES 13:30 130' RT C/L	#6670	100	99	13	2	0	0.0	12
Remarks for example of calculations when using a #8 screen in coarse sieving. This is test #6.										
8	07/25	J JONES 15:30 15' LT C/L		100	100	82	26	7	5.2	3

DATE

RE/SUPERVISOR

DATE

PROJECT NUMBER

ARIZONA DEPARTMENT OF TRANSPORTATION

OCTOBER 30, 1985

WEEKLY MATERIALS LOG

PROJECT # - IXT-084-(10)
 RE/SUPERVISOR - MR T
 MATERIAL - MINERAL AGGREGATE AC
 NAME - ***** TEST PROJECT *****
 CONTRACTOR - LIGHTNING CONSTRUCTION *****
 PURPOSE - ACCEPTANCE
 TEST DATE SAMPLED TIME
 FROM SOURCE 90-100 3/4" 3/8" #8 40-50 10-30 0-5 #200
 LY

10	10/15	MI	09:00	COLD FEED	TAN #2	100	75	35	13	4.6
11	10/15	MI	09:00	COLD FEED	TAN #2	100	75	35	13	4.6
12	10/17	MI	09:30	COLD FEED	TAN #2	100	82	43	15	5.2
					THREE TEST AVERAGE =		100	30	14	4.8
13	10/17	MI	09:30	COLD FEED	TAN #2	100	82	43	15	5.2
					THREE TEST AVERAGE =		100	40	14	5.0

PROJECT NUMBER

DATE

RE/SUPERVISOR

DATE

ARIZONA DEPARTMENT OF TRANSPORTATION

OCTOBER 30, 1963

WEEKLY MATERIALS LOG

PROJECT # - 1XF-004-(10)

RE/SUPERVISOR - MR T

MATERIAL - MINERAL AGGREGATE NO SIZE - D

PURPOSE - INFORMATIONAL

NAME - ***** TEST PROJECT *****

CONTRACTOR - LIGHTNING CONSTRUCTION

TEST #	DATE	SAMPLED TIME	FROM	ORIGINAL	3/4"	3/8"	#0	40-50	10-30	#40	#200
	BY			SOURCE	90-100	70-80	40-50	10-30	0-5		
67	03/25	12:00	STOCKPILE	TAN #1	100	100	96	53	3.3		
77	03/25	12:00	STOCKPILE	TAN #1	100	100	96	53	3.3		
07	03/25	12:00	STOCKPILE	TAN #1	100	100	96	53	3.3		
97	03/25	12:00	STOCKPILE	TAN #1	100	100	96	53	3.3		
107	03/25	12:00	STOCKPILE	TAN #1	100	100	96	53	3.3		

PROJECT LOCATION

DATE

RE/SUPERVISOR

DATE

ARIZONA DEPARTMENT OF TRANSPORTATION

OCTOBER 30, 1965

WEEKLY MATERIAL/LB LOG

PROJECT # - 121-004-(0)
 RE/SUPERVISOR - MR T
 NAME - ***** TEST PROJECT *****
 CONTRACTOR - LIGHTNING CONSTRUCTION

MATERIAL - MINERAL AGGREGATE AC SIZE - C PURPOSE - INFORMATIONAL

TEST DATE SAMPLED TIME FROM SOURCE 90-100 70-80 3/8" #8 #40 #200 0-5

#	RY	DATE	SAMPLED	FROM	SOURCE	90-100	70-80	3/8"	#8	#40	#200	0-5
64	03/25	111	03:00	STOCKPILE	TAN #1	100	5	0	0	0	0.0	0.0
74	03/25	111	03:00	STOCKPILE	TAN #1	100	5	0	0	0	0.0	0.0
84	03/25	111	03:00	STOCKPILE	TAN #1	100	5	0	0	0	0.0	0.0
94	03/25	111	03:00	STOCKPILE	TAN #1	100	5	0	0	0	0.0	0.0
4	03/25	111	03:00	STOCKPILE	TAN #1	100	5	0	0	0	0.0	0.0

DATE

RE/SUPERVISOR

DATE

PROJECT LAMM/11

ARIZONA DEPARTMENT OF TRANSPORTATION

WEEKLY MAINTENANCE LOG

OCTOBER 30, 1902

PROJECT # - 1XF-004-(0)

RE/SUPERVISOR - MR. T

NAME - ***** TEST PROJECT *****
CONTRACTOR - LIGHTNING CONSTRUCTION *****

MATERIAL - MINERAL AGGREGATE AC SIZE - F PURPOSE - INFORMATIONAL

TEST DATE SAMPLED TIME 10:30 STOCKPILE
BY FROM 30-100 70-80 40-50 10-30 0-5

66 03/25 MI 10:30 STOCKPILE TAN #1. 100 100 61 17 6.8

Remarks for INFORMATION on MA AC FINES.
MIX #1, TEST # 66.

66 03/25 MI	10:30 STOCKPILE	TAN #1. 100	100	61	17	6.8
66 03/25 MI	10:30 STOCKPILE	TAN #1. 100	100	61	17	6.8
96 03/25 MI	10:30 STOCKPILE	TAN #1. 100	100	61	17	6.8
106 03/25 MI	10:30 STOCKPILE	TAN #1. 100	100	61	17	6.8

PROJECT LOCATION

DATE

RE/SUPERVISOR

DATE

ARIZONA DEPARTMENT OF TRANSPORTATION

OCTOBER 30, 1983

WEEKLY MATERIALS LOG

PROJECT # - 1X6-00A-(0)

RE/SUPERVISOR - MHT

MATERIAL - MINERAL AGGREGATE AC SIZE - 1

TEST DATE: SAMPLED TIME

FROM

TO

BY

65 09/25 MHT 09:00 STOCKPILE

Remarks for INFORMATION on MA AC INTERMEDIATE

NIX #1, TEST # 65.

75 09/25 MHT 09:00 STOCKPILE

85 09/25 MHT 09:00 STOCKPILE

95 09/25 MHT 09:00 STOCKPILE

105 09/25 MHT 09:00 STOCKPILE

NAME - ***** TEST PROJECT *****
CONTRACTOR - LIGHTNING CONSTRUCTION

PURPOSE - INFORMATIONAL

ORIGINAL 3/4" 3/8" #8 #40 #200

SOURCE 90-100 70-80 40-20 10-30 0-5

TAN #1 100 91 3 1 0.0

TAN #1 100 91 3 1 0.0

TAN #1 100 91 3 1 0.0

TAN #1 100 91 3 1 0.0

TAN #1 100 91 3 1 0.0

TAN #1 100 91 3 1 0.0

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TAN #1 100 91 3 1 0.0

TAN #1 100 91 3 1 0.0

TAN #1 100 91 3 1 0.0

PROJECT LOGSHEET

DATE

RE/SUPERVISOR

DATE

ARIZONA DEPARTMENT OF TRANSPORTATION

OCTOBER 30, 1905

WEEKLY ASPHALTIC CONCRETE LOG

PROJECT # - 1X-004-(0)

RE/SUPERVISOR - MR T

MATERIAL - ASPHALTIC CONCRETE 34

NAME - ***** TEST PROJECT *****
CONTRACTOR - LIGHTNING CONSTRUCTION

PURPOSE - ACCEPTANCE

TEST DATE SAMPLED TIME SAMPLED FROM

BY

1" 3/4" 1/2" #0 #40 #200 XASPH. VMN EV V.F. DULK DENS.

14	07/26	LAQUINN	11:25	LEFT TURNWAY	100	91	79	50	18	3.7	4.97	15.6	5.7	63.4	142.4
15	07/26	LAQUINN	11:25	20' LT C/L	100	91	79	50	18	3.7	4.97	15.6	5.7	63.4	142.4
16	07/27	LAQUINN	10:00	RELT	100	91	79	50	18	3.7	4.97	15.6	5.7	63.4	142.4
THREE TEST AVERAGE =					100	91	79	50	18	3.7	4.97	15.6	5.7	63.4	142.4

Remarks for NC 3/4 test #16.

PROJECT LAQUINN

DATE

RE/SUPERVISOR

DATE

ARIZONA DEPARTMENT OF TRANSPORTATION

OCTOBER 30, 1965

WEEKLY CONCRETE CYL. LOG

PROJECT # - 111-004-(0) NAME - TEST PROJECT *****

RE/SUPERVISOR - MR T CONTRACTOR - LIGHTNING CONSTRUCTION *****

MATERIAL - CONCRETE CYL. LOG CLASS 'B' 3000 PSI PURPOSE - ACCEPTANCE *****

TEST DATE PLACED IN AIR GLUMP S(7) S(20) S(20) AVE S(20) *****

MADE LOCATION 3000 *****

#	MADE	LOCATION	2.0	4.00	2150	3450	3200	3325
5	09/02	FLOOR	2.0	4.00	2150	3450	3200	3325
6	09/02	FLOOR	1.0	3.50	2080	3350	3700	3525
7	09/02	FLOOR	1.0	4.00	1900	3200	3250	3225
8	09/02	FLOOR	2.0	4.50	1850	3350	3025	3180
9	09/02	FLOOR	1.0	4.00	1775	3100	3450	3275

PROJECT LOCATION

DATE

RE/SUPERVISOR

DATE

ARIZONA DEPARTMENT OF TRANSPORTATION

WEEKLY PROCTOR LOG

OCTOBER 30, 1965

PROJECT # - 1X1-004-(0)

NAME - TEST PROJECT

RE/SUPERVISOR - MR T

CONTRACTOR - LIGHTNING CONSTRUCTION

MATERIAL - SPECIAL BACKFILL

PURPOSE - PROCTOR

TEST DATE

SOURCE OF MATERIAL

LOCATION OF TEST

METHOD USED

WATER

OPTIMUM MOISTURE

MAXIMUM DENSITY

ADJUSTED PROCTOR

2

00/04

RD & RD

MR WINGWALL

229+10

N

3.0

14.6

113.4

6.7

Clark St. Bridge.
Gravitation & proctor.

PROJECT NUMBER

DATE

RE/SUPERVISOR

DATE

WEEKLY CONNECTION LOG

WEEKLY CONNECTION LOG

***** Q37100.J 1631. 744 H.1. 1

DATE _____

OCTOBER 30, 1945

WEEKLY NEWSLETTER CONCRETE COMPRESSION LOG

PROJECT # - 378-1114-10

PROJECT # 388-0000-0000
RE/SUPERVISOR - MR T

MATERIAL - ALUMINUM CONCRETE 34 METHOD - NUCLEAR PURPOSE - LOT COMPLIANCE

PURPOSE - LOT COMPLIANCE

LOT	DATE TESTED	TEST 1	TEST 2	TEST 3	TEST 4	TEST 5	TEST 6	TEST 7	PERCENT COMPLIANCE
40	TESTED	1	2	3	4	5	6	7	

AVE. COMPLIANCE

73

76

4

7

W

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1	11/03	140.7	137.5	137.8	140.5	135.9	139.3	130.7	86
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30.7

33.3

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20

9

1

PROJECT LUNAR

DATE _____

RE/SUPERVISOR

3100

APPENDIX G

MAINFRAME AND PC QUERY MANUAL

INTRODUCTION

This user guide is designed to aid ADOT personnel in the operation of the Construction Materials Testing Data Base Query. The Table of Contents on the following page lists specific operating procedures incorporated into this system.

Should any problems be encountered with this manual or the operating system, please contact Kurt Denham at 255-8714 or Rosemary Amagai at 255-8715, Engineering Systems.

* * * * *

PLEASE NOTE THE FOLLOWING:

Until further notice, the general instructions for screen data entry on Page 3 regarding procedure termination or the abortion of a current screen should be followed only through the Ctrl-Break sequence. After this point, the user must enter "RUN" to rerun the procedure unless the screen indicates that the procedure has entered the communications phase; in this case, enter "SYSTEM" to return to DOS and then enter "CMTQ" to rerun the procedure.

August 8, 1986

OPERATING SYSTEM

The Construction Materials Testing Query System is designed to retrieve data in various forms from the Construction Materials Quality Assurance Data Base. This data base includes the logging and calculations of materials tests statewide through the Construction Materials Testing System.

The CMTQ System incorporates two modes of operation --- PC and WYLBUR --- as the means to retrieve data from the data base through query screen display as well as printed reports.

MODE OF OPERATION - PC
Master Menu

The CMT Query System for the PC incorporates several procedures into a master menu. The first step is to get into the CMT directory. Then enter

CMTQ

This will display the following master menu operating screen.

VERSION 2.38
ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM CMT QUERY SYSTEM
. DATA BASE QUERY . PRINTED REPORT . EXIT QUERY SYSTEM
USE OR TO SELECT <- TO EXECUTE

In order to successfully complete the screens associated with a desired procedure, it is important to review some general instructions concerning screen data entry on the PC. These are found on Page 3. Next, enter the desired procedure option.

MODE OF OPERATION - PC
Screen Data Entry

General instructions for screen data entry on the PC are as follows:

- o Use upper case for all letters in response data fields.
- o Keep in mind that a PC prompting screen is not typed and entered in the same manner as a WYLBUR screen. Each line item requiring a response is taken in turn with the response data field typed in or completely typed over. Left and right cursor positional keys (arrows) can be used to correct any errors in the response data field of the line in question. If the data is correct, then the line must be entered.
- o An error message will be displayed if data just entered is invalid. The cursor will return to this response data field for correction and re-entry before proceeding to the next response data field in a subsequent line.
- o Do not use the cursor positional keys (arrows) to move at will on the screen for either data entry or correction of response data fields. If incorrect data has been entered and accepted, the procedure must be terminated by using the Ctrl-Break keys. Press and hold the Ctrl(Control) key, and then press the Break key; next, release both keys. The procedure now must be run again.
- o If you want to abort the current screen, follow the Ctrl-Break sequence in the preceding item.

MODE OF OPERATION - PC
Data Base Query
WYLBUR and JCL Setup

The Data Base Query option provides selection criteria for querying the Construction Materials Testing data base. The first step is to enter necessary information for WYLBUR and the JCL. The following screen is displayed.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
DOWNLOAD PROCEDURE
WYLBUR AND JCL SETUP

WYLBUR PHONE NO. : 7502
WYLBUR USERID :
WYLBUR PASSWORD :
PC COM PORT (1 OR 2) : 1

The cursor will identify each response data field to be entered. If the default data is correct, simply press the Enter key. If the response data field is blank, type in the required data. Change an incorrect response data field by typing over the data. However, if you start to type over a default response, the entire field must be typed. Then, press the Enter key to enter the response.

Upon successful completion of data entry on this screen, the option to "(C)ONTINUE OR (R)EENTER" will be displayed. Pressing "C" will provide the next screen for the data base query; pressing "R" will reset the cursor to the first data response field. In this case, all fields must be reentered.

MODE OF OPERATION - PC
Data Base Query

The criteria screen for the data base query is as follows:

```
ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
DATA BASE QUERY

PROJECT CODE      : XXXX
MATERIAL CODE     : XX
TYPE CODE        : XX
PURPOSE          : X
SPEC/DESIGN NUMBER : XX
DATE RANGE       : MM/DD/YY TO MM/DD/YY

. SOILS AND AGGREGATE GRADATIONS
. ASPHALTIC CONCRETE
. CONCRETE CYLINDER LOGS
. COMPACTION
. PROCTOR
. NUCLEAR DENSITY
. AC MIX DESIGN
. CONCRETE MIX DESIGN
. PROCTOR DESIGN
. GRADATION SPECIFICATIONS
. END

USE | OR | TO SELECT  <-| TO EXECUTE
```

Required information includes the project code, material code, type code, date range, and record type. Optional fields are purpose and spec/design number.

The cursor will identify each response data field to be entered. Type over the X's with the desired data and then press the Enter key for each data field. In the case of a blank type code, you must type over the "XX" with the same. For the optional fields, if you have no response, press the

Enter key. Change an incorrect data field by typing over the data. However, if you start to type over a response, the entire field must be typed. In regard to the date range, type over fields but use only the Backspace and the Forward Tab keys for error correction. Upon completion of these fields, the list of record types will appear. Use the up and down cursor positional keys (arrows) to highlight your selection and then press the Enter key.

In order to end the session, you can press the Enter key when a new query screen is displayed or enter data and select the "END" option in the record list.

Upon successful completion of data entry on this screen, the option to "(C)ONTINUE OR (R)EENTER" will be displayed. Pressing "C" will continue with the PC to mainframe communication and the selection of records for download and subsequent display; pressing "R" will reset the cursor to the first data response field. In this case, all fields must be reentered.

MODE OF OPERATION - PC
Printed Report

The Printed Report procedure allows reporting for a specific period of time using the PC printer or mainframe report generation. The entry screen is as follows:

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM PRINTED REPORT	
PROJECT CODE	: XXXX
DATE RANGE	: MM/DD/YY TO MM/DD/YY
REPORTING OPTION	: X
(P)C	
(M)AINFRAME	

Required information includes the project code, date range, and reporting option.

The cursor will identify each response data field to be entered. Type over the field with the desired data and then press the Enter key for each data field. In regard to the date range, type over fields but only use the Backspace and the Forward Tab keys for error correction.

Upon successful completion of data entry on this screen, the option to "(C)ONTINUE OR (R)EENTER" will be displayed. Pressing "C" will continue with the screen for WYLBUR and JCL information; pressing "R" will reset the cursor to the first data response field. In this case, all fields must be reentered.

MODE OF OPERATION - PC
Printed Report
WYLBUR and JCL Setup

The Printed Report procedure requires entry of WYLBUR and JCL information. The following screen is displayed for the PC reporting option.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
DOWNLOAD PROCEDURE
WYLBUR AND JCL SETUP

WYLBUR PHONE NO. : 7502
WYLBUR USERID :
WYLBUR PASSWORD :
PC COM PORT (1 OR 2) : 1

The cursor will identify each response data field to be entered. If the default data is correct, simply press the Enter key. If the response data field is blank, type in the required data. Change an incorrect response data field by typing over the data. However, if you start to type over a default response, the entire field must be typed. Then, press the Enter key to enter the response.

Upon successful completion of data entry on this screen, the option to "(C)ONTINUE OR (R)EENTER" will be displayed. Pressing "C" will continue with generation of a printed report through the PC printer; pressing "R" will reset the cursor to the first data response field. In this case, all fields must be reentered.

The following screen is displayed for the mainframe reporting option.

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
DOWNLOAD PROCEDURE
WYLBUR AND JCL SETUP

WYLBUR PHONE NO. : 7502
WYLBUR USERID :
WYLBUR PASSWORD :
PC COM PORT (1 OR 2) : 1
WORK ORDER :
MAIL DROP :
PRINTER :

The cursor will identify each response data field to be entered. If the default data is correct, simply press the Enter key. If the response data field is blank, type in the required data. Change an incorrect response data field by typing over the data. However, if you start to type over a default response, the entire field must be typed. Then, press the Enter key to enter the response.

Upon successful completion of data entry on this screen, the option to "(C)ONTINUE OR (R)EENTER" will be displayed. Pressing "C" will submit a batch job for a printed report through WYLBUR; pressing "R" will reset the cursor to the first data response field. In this case, all fields must be reentered.

MODE OF OPERATION - WYLBUR
Master Menu

The CMT Query System for WYLBUR incorporates several procedures into a master menu. The first step is to log on to WYLBUR. Then enter

EXE FRO \$EU209.EXEC.LIB#CMTQ CLE

This will display the following master menu.

MA292A
VERSION 2.38

ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM
CMT QUERY SYSTEM

1. DATA BASE QUERY
2. PRINTED REPORT
3. EXIT QUERY SYSTEM

ENTER THE DESIRED SELECTION:

In order to successfully complete the screens associated with a desired procedure, it is important to review some general instructions concerning screen data entry in WYLBUR. These are found on Page 11. Next, enter the desired procedure option.

MODE OF OPERATION - WYLBUR
Screen Data Entry

General instructions for screen data entry in WYLBUR are as follows:

- o Use upper case for all letters in response data fields.
- o An error message will be displayed if data just entered is invalid. The cursor will return to this response data field for correction and re-entry before proceeding to the next response data field in a subsequent line.
- o Use key "ERASE EOF" to clear out any unwanted characters in a data entry screen. All data in the field (line) from the cursor to the end of the field will be erased.
- o Use the Tab key or Return key to move the cursor from one field on the screen to the next. This key will position the cursor at the proper location for data entry.

MODE OF OPERATION - WYLBUR
Data Base Query

The criteria screen for the data base query is as follows:

MA292A-1A	
ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM DATA BASE QUERY	
PROJECT CODE	: XXXX
MATERIAL CODE	: XX
TYPE CODE	: XX
PURPOSE	: X
SPEC/DESIGN NUMBER	: XX
DATE RANGE	: MM/DD/YY TO MM/DD/YY
ENTER THE DESIRED SELECTION BELOW:	A. SOILS AND AGGREGATE GRADATIONS B. ASPHALTIC CONCRETE C. CONCRETE CYLINDER LOGS D. COMPACTION E. PROCTOR F. NUCLEAR DENSITY H. AC MIX DESIGN I. CONCRETE MIX DESIGN J. PROCTOR DESIGN K. GRADATION SPECIFICATIONS X. END

Required information includes the project code, material code, type code, date range, and record type. Optional fields are purpose and spec/design number.

The cursor will identify each response data field to be entered. Type over the X's and date fields with the desired data. For optional or blank fields, press the Tab key if there is no response. Change an incorrect data field by typing over the field. Upon completion of data entry, press the Enter key. Records will be selected for display.

MODE OF OPERATION - WYLEUR
Printed Report

The Printed Report procedure has options for two types of reporting --- data and specifications. The entry screen is as follows:

MA292A-2A	
ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM PRINTED REPORT	
TYPE OF REPORT:	X
	(D)ATA
	(S)PEC
ENTER FOR DATA REPORT ONLY:	
PROJECT CODE	: XXXX
DATE RANGE	: MM/DD/YY TO MM/DD/YY
* FOR A COMPLETE DATA REPORT OF ALL PROJECT CODES ENTER "ALL" IN PROJECT CODE FIELD AND LEAVE DATE RANGE BLANK.	

Required information includes the type of report and the project code designation and date range for the data report only. The data report allows for reporting on a single project code for a specific period of time as well as reporting on all projects in the data base. The spec report provides a report of all specifications in the data base, sorted by material type, type code, and spec number.

The cursor will identify each response data field to be entered. Type over the fields with the desired data. Change an incorrect data field by typing over the field. Upon completion of data entry, press the Enter key. Successful completion of data entry on this screen will provide the next screen for JCL information.

The following screen is displayed for JCL information.

MA292A-2B		
ARIZONA DEPARTMENT OF TRANSPORTATION MATERIALS PROGRAM		
JCL SETUP		
WORK ORDER	:	(XXXX)
MAIL DROP	:	(XXXX)
PRINTER	:	(RMTXX OR LOCAL)

The cursor will identify each response data field to be entered. Type over the fields with the desired data. Change an incorrect data field by typing over the field. Upon completion of data entry, press the Enter key. Successful completion of data entry on this screen will submit a batch job for a printed report through WYLBUR.