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16. Abstract <p>The Center for Transportation Research of The University of Texas at Austin in conjunction with the SDHPT personnel from the Highway Design Division has periodically conducted condition surveys of continuously reinforced and jointed concrete pavements at both the network and project levels since 1974. This continuous monitoring has included pavement sections throughout the state of Texas, and the gathered data have been used to prioritize the rehabilitation needs of the rigid-pavement network in Texas in 1982 and 1983 by means of computer program PRPO-1. However, the condition survey procedures required for collecting such information recommend average monitoring speeds of 2 to 5 mph. These speeds are considered too low to collect data for the Rigid Pavement Evaluation System (RPES), currently under development by the Texas SDHPT. Therefore, it was necessary to increase the speed during the data collection process and record only the most significant information. This objective was accomplished via a field experiment and statistical analyses, and the condition survey manual presented herein evolved from the results and conclusions pertaining to that study. Condition surveys according to the new procedures should be conducted at an average speed of 15 mph. This report also presents an input guide for a microcomputer program that speeds up and facilitates the entry and storage of condition survey data when the recommend procedures for collecting distress information on rigid pavements at the network level are followed.</p>					
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MANUAL FOR CONDITION SURVEY OF
CONTINUOUSLY REINFORCED CONCRETE PAVEMENTS
AND
JOINTED CONCRETE PAVEMENTS

by

Chhote Saraf
Victor Torres-Verdin
B. Frank McCullough

Research Report Number 388-3

Condition Survey and Performance Monitoring
of Existing and Overlaid Rigid Pavements
Research Project 3-8-84-388

conducted for

Texas State Department of Highways
and Public Transportation

in cooperation with the
U. S. Department of Transportation
Federal Highway Administration

by the

Center for Transportation Research
Bureau of Engineering Research
The University of Texas at Austin

May 1985

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

PREFACE

This is the third report of work done under Research Project 3-8-84-388, "Condition Survey and Performance Monitoring of Existing and Overlaid Rigid Pavements". Condition survey procedures for JC and CRC pavements are presented herein, which consider an average survey speed of 15 mph.

The authors appreciate the help provided by the Texas SDHPT during the surveys. Bob Guinn, Richard Rogers, and James Sassin of SDHPT provided valuable comments in the preparation of this manual. The cooperation of CTR staff, in particular Lyn Gabbert and Rachel Hinshaw for typing the manuscript, Art Frakes for his efforts in coordinating the preparation of this report, Jim Long for conducting and coordinating the field surveys, and Janis Cawthron for developing the computer program "QUICKSUR" is greatly appreciated.

Chhote Saraf
Victor Torres-Verdin
B. Frank McCullough

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LIST OF REPORTS

Report No. 388-1, "Development of a Deflection Distress Index for Project-Level Evaluation of CRC Pavements," by Victor Torres-Verdin and B. Frank McCullough, presents the derivation of a new approach for project-level evaluation of CRC pavements from condition survey data. The main features of computer program DD11, which incorporates the principal findings from the study, are discussed and an input guide for that program is provided along with a project-level condition survey manual.

Report No. 388-2, "Evaluation of the Effect of Survey Speed on Network-Level Collection of Rigid-Pavement Distress Data," by Victor Torres-Verdin, Chhote Saraf and B. Frank McCullough, describes work done in relation with an experiment performed to evaluate the effect of monitoring speed on the quality of rigid-pavement distress data collected at the network level.

Report No. 388-3, "Manual for Condition Survey of Continuously Reinforced Concrete Pavements and Jointed Concrete Pavements," by Chhote Saraf, Victor Torres-Verdin and B. Frank McCullough, presents the procedures for condition survey of CRC and JC pavements recommended for the Rigid Pavement Evaluation System.

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ABSTRACT

The Center for Transportation Research of The University of Texas at Austin in conjunction with the SDHPT personnel from the Highway Design Division has periodically conducted condition surveys of continuously reinforced and jointed concrete pavements at both the network and project levels since 1974. This continuous monitoring has included pavement sections throughout the state of Texas, and the gathered data have been used to prioritize the rehabilitation needs of the rigid-pavement network in Texas in 1982 and 1983 by means of computer program PRPO-1. However, the condition survey procedures required for collecting such information recommend average monitoring speeds of 2 to 5 mph. These speeds are considered too low to collect data for the Rigid Pavement Evaluation System (RPES), currently under development by the Texas SDHPT. Therefore, it was necessary to increase the speed during the data collection process and record only the most significant information. This objective was accomplished via a field experiment and statistical analyses, and the condition survey manual presented herein evolved from the results and conclusions pertaining to that study. Condition surveys according to the new procedures should be conducted at an average speed of 15 mph. This report also presents an input guide for a microcomputer program that speeds up and facilitates the entry and storage of condition survey data when the recommended procedures for collecting distress information on rigid pavements at the network level are followed.

KEYWORDS: Condition survey, rigid pavement, continuously reinforced concrete pavement (CRCP), jointed concrete pavement (JCP), Rigid Pavement Evaluation System (RPES).

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SUMMARY

This report presents a manual for network-level condition surveying of CRC and JC Pavements; and includes the result of an experiment conducted in February and March 1984. The objective of this experiment was to ascertain the effect of increased survey speed on the quality of the distress data collected. It was concluded from statistical analyses that 15 mph is the maximum average survey speed that will insure adequate distress information. A description of the distress manifestations to be recorded in the RPES is included in this manual. Appendix A describes an interactive program, QUICKSUR, created to run on the Apple MacIntosh Personal Computer. This program automates the entry of condition survey data for CRC and JC pavements and stores these data in disks. The information collected in this manner can be subsequently used in program PRPO-1 to prioritize the rehabilitation needs of the pavement sections surveyed.

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IMPLEMENTATION STATEMENT

The manual for condition surveys of CRC and JC Pavements presented in this report can be used for collecting data in accordance with the requirements of the Rigid Pavement Evaluation System, which is currently being developed by the Texas SDHPT. It is recommended that this manual be distributed to the personnel in charge of conducting condition surveys of rigid pavements.

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INTRODUCTION

Concrete pavements have been surveyed for their condition by the Center for Transportation (CTR) staff in conjunction with the SDHPT personnel from Highway Design Division since 1974 (Ref 1). Procedures for conducting these surveys were developed and modified as needed (Refs 2, 3). All condition survey data were collected for road sections of 0.2-mile. The surveyors generally travelled in a vehicle on the shoulders at a speed of 2 to 5 miles per hour. However, in early 1984, the Texas SDHPT staff indicated that the speed was too slow for their PES (Pavement Evaluation System) related surveys. They also suggested that the data should be collected for 0.4-mile sections instead of 0.2-mile.

An experiment was conducted in February and March 1984 to determine the effect of speed on the condition survey data. The details of this study are included in Research Report 388-2 (Ref 4).

As a result of that experiment, it was decided to conduct the condition surveys at a speed of 15 miles per hour. The current condition survey manual includes the changes in speed, section length, and certain recording procedures which were jointly agreed by the CTR and SDHPT staff. The manual covers both CRCP and jointed concrete pavements. These procedures were used in the condition surveys conducted during the summer and fall of 1984.

A computer program, QUICKSUR, was developed to enter field data directly on a microcomputer disc. This speeded up the data-entry process and saved time to enter the data on computer data files for further processing. A brief introduction to "QUICKSUR" is enclosed in Appendix A.

SURVEY PROCEDURE

The road is surveyed by two surveyors (recorders) and a driver in one vehicle, travelling on the shoulder at approximately 15 miles per hour. The recorders sit in the back seats directly behind the driver. Depending on the condition of the roadway the two recorders will keep track of different distress manifestations. In order to allow the driver to concentrate on

driving, he does not participate in surveying. Only the distress manifestations in the outside lane of the roadway are counted.

The road is surveyed in sections of 0.4 mile. A tally of the different distress manifestations is kept on mechanical counters mounted on a clipboard. When the distress manifestations over a 0.4-mile section of roadway have been tallied, the quantities are transferred to the field sheet by the recorders, and the counters are reset. The recorder will also enter a two digit code in the column on the field sheet marked "Comment Code" when overlays, bridges, or ramps are encountered on the 0.4-mile section. The digits to be entered are 01 for overlays, 02 for bridges, and 03 for ramps.

During the 1984 condition surveys, the mechanical counters were replaced by a micro-computer (Apple MacIntosh) equipped with an extra key pad. This allowed both recorders to enter the data on the disk simultaneously. A computer program QUICKSUR was developed to facilitate the data entry on a computer disk. The details of this procedure are included in Appendix A.

CRCP DISTRESS TYPES

In this section, first special considerations in the survey procedure are presented, followed by detailed descriptions of each distress type.

Special Considerations

As stated in "Survey Procedure," the driver will not participate in the surveys. However, he can help the recorders by informing them of the beginning and end of 0.4-mile sections so that they can concentrate on pavement condition surveys. Also, the recorders can take turns in driving the survey vehicle so as to reduce fatigue and break the monotony of surveying the pavements. This will require the entire crew of three persons to be properly trained for the condition survey job. It is to be remembered that when asphalt or portland cement concrete has been applied to a distress for level-up purposes but the original distress is still evident, the

original distress (e.g., punchout, severe spalling) is counted, not the patch.

Distress Description

The distress types applicable to CRC pavements and recorded in this procedure are severe spalling, severe punchouts, and asphalt and portland cement concrete patches.

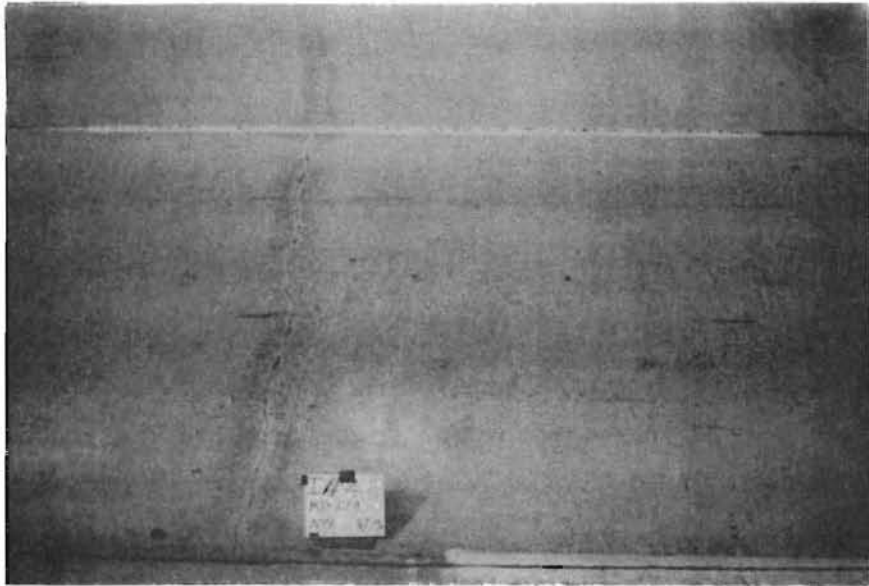
Severe Spalling. Spalling is defined as the widening of existing cracks by secondary cracking or breaking of the crack edges. The severity of a spall is determined by the width of the spall. Severe spalling is defined as a condition in which the spall has widened by an inch or more (see Fig 1).

Only the transverse cracks showing signs of spalling are counted. The whole crack is defined by the most severe condition of spalling that exists along that crack. For example, although the whole crack may be in "good" condition, the presence of only a small length of spalling which is wider than an inch defines that crack as severely spalled. Similarly, if the spall is narrower than an inch, the crack is not defined as severely spalled.

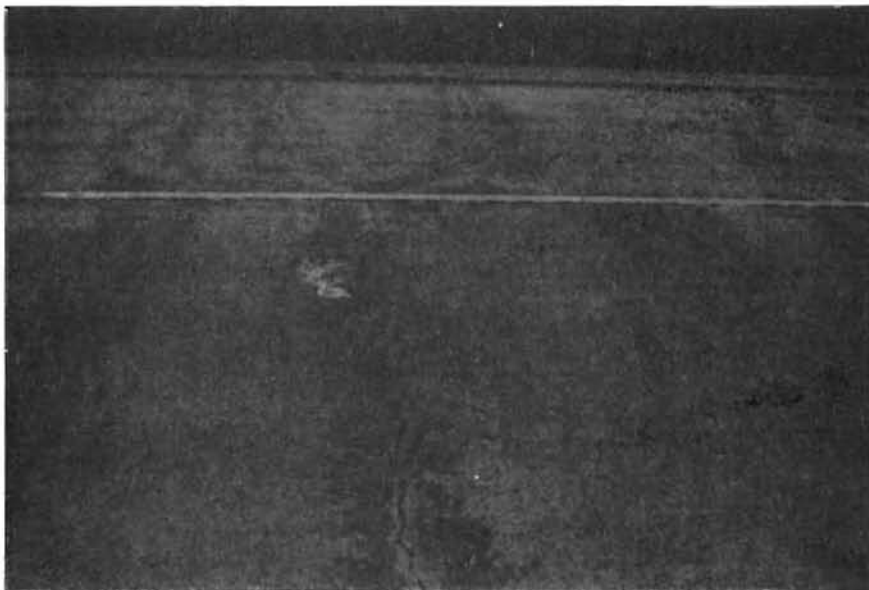
Minor and Severe Punchouts. When closely spaced transverse cracks are linked by longitudinal cracks to form a block, the block is called a punchout. This should not be confused with longitudinal cracking, which is not recorded on the sheet. A minor punchout is defined as a condition where, although a block has formed, no sign of movement under traffic loads is apparent. The cracks surrounding the punchout are narrow and few signs of spalling are apparent (see Fig 2). In a severe punchout, the surrounding cracks are fairly wide and signs of pumping around the edges of the block may be observed (see Fig 3). This is caused by the movement of the punchout block under the traffic loads.

When the longitudinal crack of a punchout extends across several transverse cracks, only one punchout should be recorded. Only the number of severe punchouts per 0.4-mile section are recorded on the survey sheet.

Difficulties exist in distinguishing between a long punchout and a longitudinal crack. A punchout is recorded only when a longitudinal crack connects two or more transverse cracks. A long punchout can be recorded as a



(a) minor spalling (not counted).



(b) severe spalling (counted).

Fig 1. Spalling

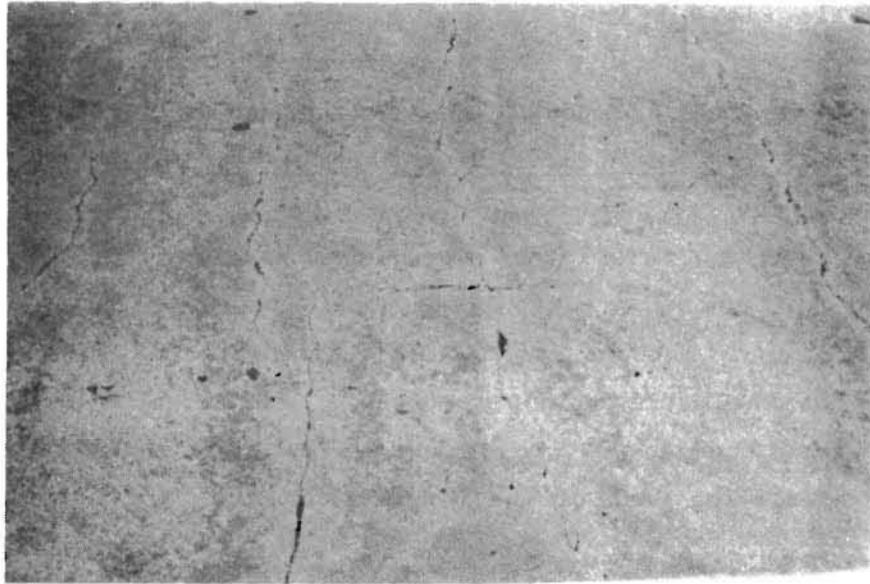


Fig 2. Minor punchouts.



Fig 3. Severe punchouts.

number of smaller punchouts if the longitudinal crack has distinct offsets in it, as shown in Fig 4. Longitudinal cracks forming the sides of long punchouts are generally narrow. The development of a severe punchout is much slower in the case of long punchouts than in the case of short punchouts.

Asphalt and Portland Cement Repair Patches. Severe punchouts are repaired by patching the pavement. A repair patch is defined as a repaired section of the pavement where the repair work has been carried out to the full depth of the concrete. Asphalt concrete repair patches and portland cement concrete repair patches are counted separately.

The size of the patch is not recorded. If the patch exhibits a very serious distress condition, it is counted as a punchout. Patching of spalling and overlaying part of the concrete pavement are not classified as patches.

A number of different patching methods are used. Patch sizes may vary from being little larger than the original punchout (see Fig 5) to a full lane width, as shown in Fig 6.

JOINTED CONCRETE PAVEMENT DISTRESS TYPES

In this section, special considerations for surveying jointed concrete pavements are presented, followed by a detailed description of each distress type.

Special Considerations

As stated in "Survey Procedure," the driver will not participate in the surveys. However, he can help the recorders by informing them of the beginning and end of 0.4-mile sections so that they can concentrate on pavement condition surveys. Also, the recorders can take turns in driving the survey vehicle so as to reduce fatigue and break the monotony of surveying the pavements. This will require the entire crew of three persons to be properly trained for the condition survey job.

For jointed concrete pavements, it is recommended that one person count corner breaks and punchouts, and patches. The other person will count



Fig 4. Punchouts associated with an offset longitudinal crack.

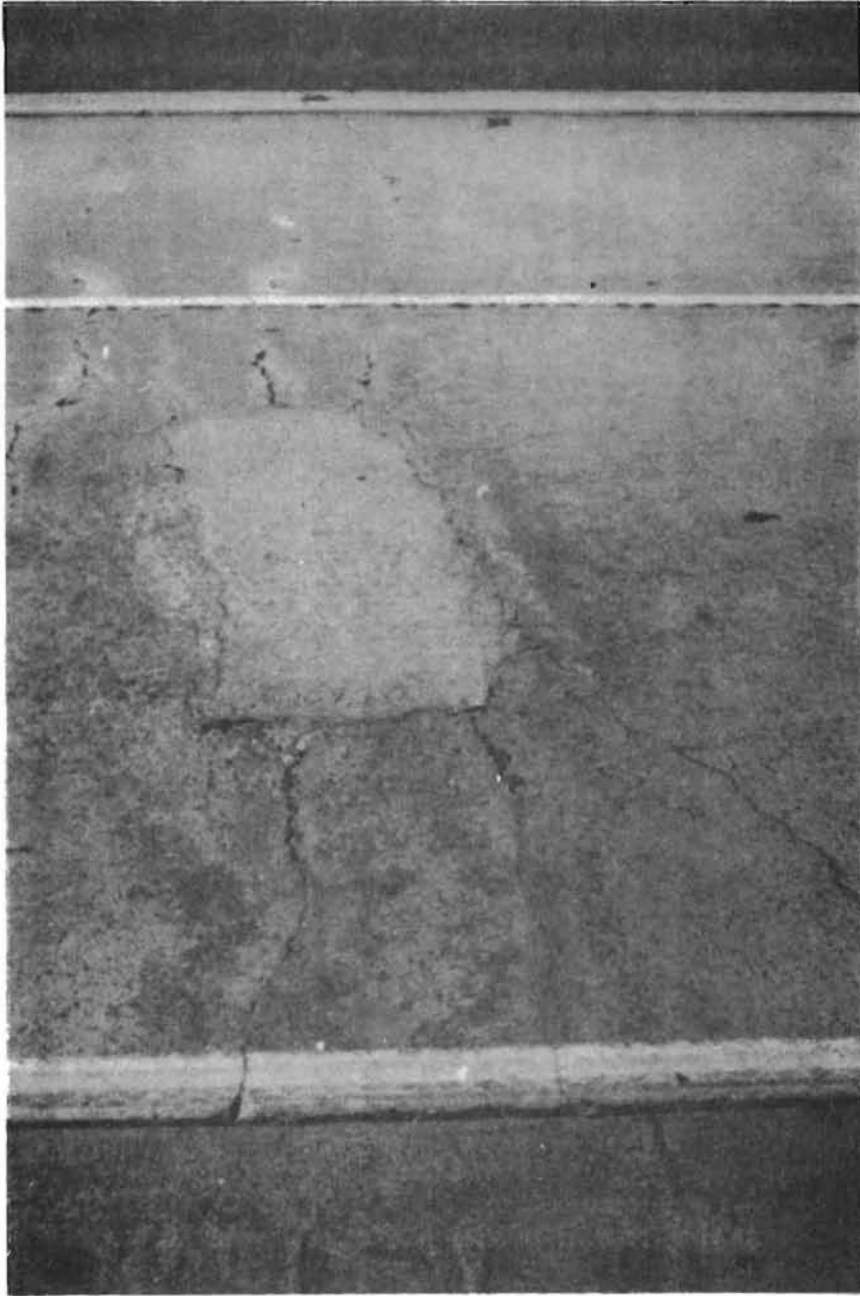


Fig 5. Small concrete patch.

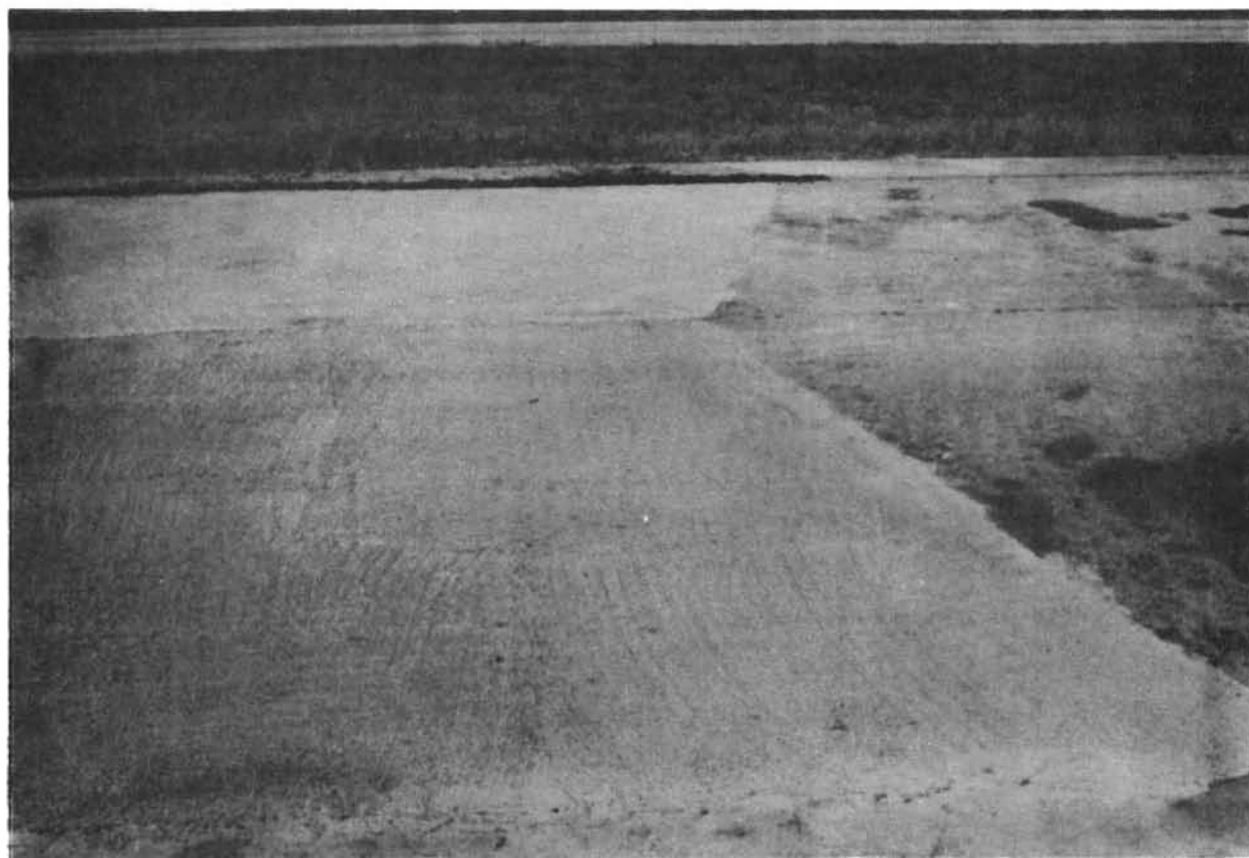


Fig 6. Large concrete patch.

transverse cracks, spalled joints and cracks, and slabs with longitudinal cracks. The spacing of joints in Texas is, generally, either 15, 45, or 60 feet. This spacing will be noted on the field sheet in the space provided. Normally, the spacing does not change over the length of a project, but, if it does, this will also be noted on the field sheet. When a distress manifestation has asphalt or portland cement concrete added for level-up purposes but the original distress manifestation (e.g., corner breaks or punchouts, spalled joint or crack) is still evident, it is counted, not the patch. When a distress manifestation occurs on both sides of a joint and includes the joint (e.g., corner breaks on both sides of the joint, or a patch on both sides of the joint and including the joint), it is counted as two distress manifestations.

Description of Distress Manifestations

The distress types applicable to jointed concrete pavements are transverse cracks, spalled joints and cracks, corner breaks and punchouts, longitudinal cracks, and patches.

Transverse Cracks. Transverse cracks occur anywhere along the slab and are approximately perpendicular to the direction of traffic flow.

All the transverse cracks in the outside lane are counted. Cracks which do not extend past the middle of the lane are not counted (see Fig 7).

Spalled Joints and Cracks. Spalling is the widening of existing joints and cracks by secondary cracking or breaking of the concrete at the cracked edges. If the joint or crack spalling is wider than an inch it is counted as spalled (see Fig 8).

Only the transverse cracks and joints showing signs of spalling are counted. The whole crack or joint is defined by the most severe condition of spalling that exists along that crack.

Corner Breaks and Punchouts. Corner breaks occur when a crack connects a joint with a longitudinal edge of the slab (see Fig 9). Punchouts occur when longitudinal and transverse cracks meet, causing a portion of the slab, approximately rectangular in shape, to be separated from the rest of the slab (see Fig 10). Both of these distress manifestations result in smaller

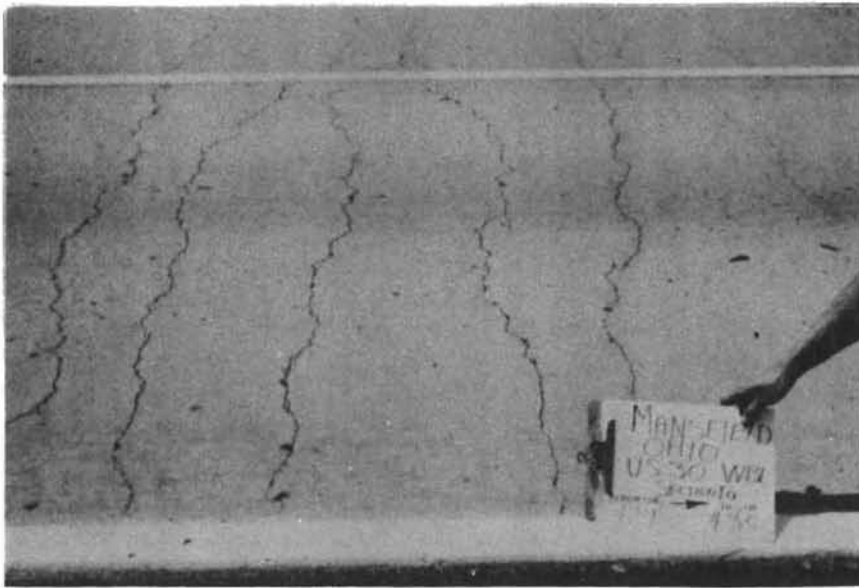


Fig 7. Transverse cracking.

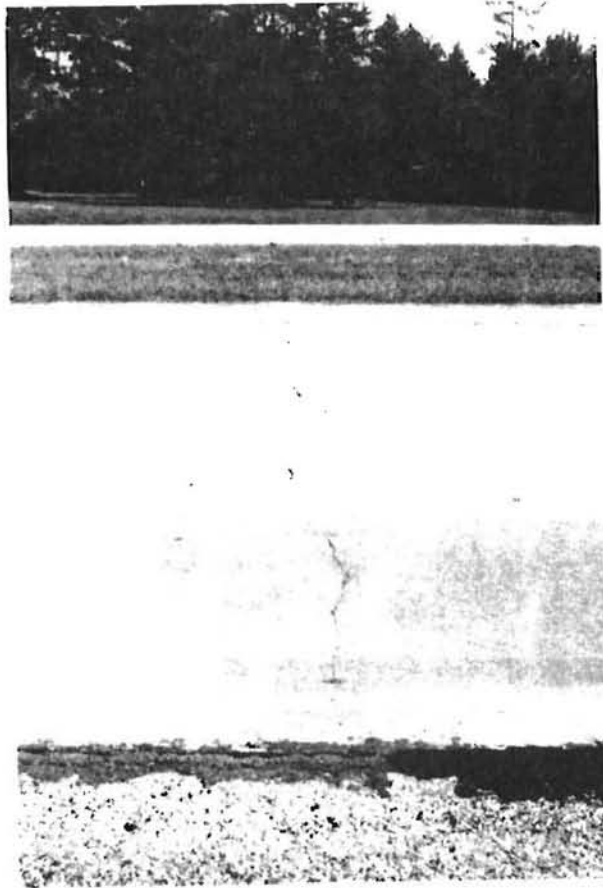


Fig 8. Spalling (counted).



Fig 9. Corner break.



Fig 11. Longitudinal cracking.



Fig 10. Punchout.

slabs, which may begin to deflect under load. These two distress manifestations are considered together and appear as one figure on the survey field sheet.

Number of Slabs with Longitudinal Cracks. Slabs with a crack or cracks approximately in the same direction as the flow of traffic are counted in this category. The longitudinal cracks may be very short or may extend the entire length of the slab (see Fig 11).

Slab Patches. The number of repair patches in the outside lane of the roadway is recorded. Portland cement concrete and asphalt concrete patches are both included in this category (see Figs 12 and 13).

The size of the patch is not recorded. If the patch exhibits the same characteristics as a corner break or punchout, it is recorded as a corner break or punchout.

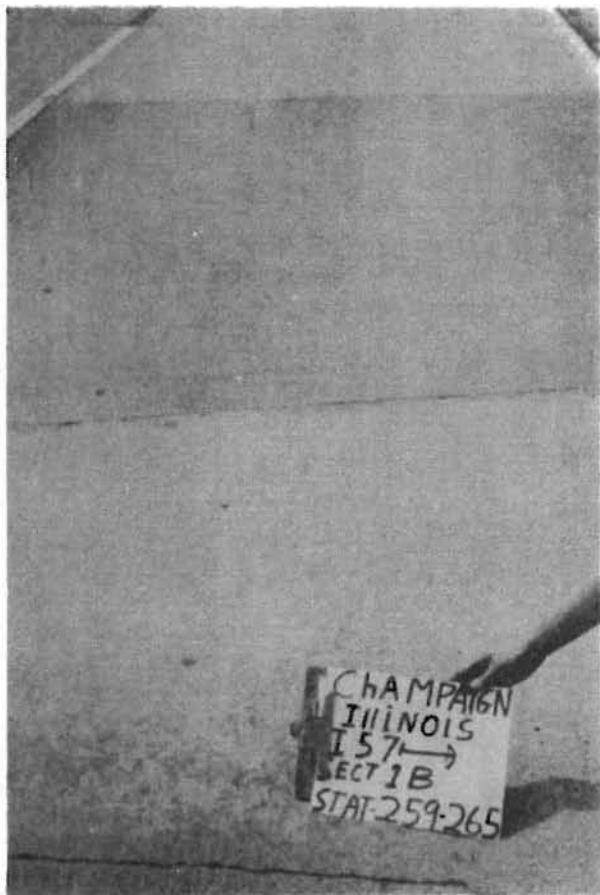


Fig 12. Portland cement concrete patch.



Fig. 13. Asphaltic concrete patch.

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APPENDIX A
"QUICKSUR" COMPUTER PROGRAM FOR ENTERING FIELD CONDITION SURVEY
DATA ON A COMPUTER DISK

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APPENDIX A. QUICKSUR COMPUTER PROGRAM FOR ENTERING FIELD CONDITION SURVEY
DATA ON A COMPUTER DISK

INTRODUCTION

QUICKSUR is an interactive BASIC program used to automate the entry of condition survey data for CRC and JC pavements. It was created to run on the Apple MacIntosh Personal Computer under the Microsoft Basic Interpreter. The MacIntosh was selected as the ideal microcomputer for this application because of its simplicity and its ability to allow two separate raters to enter data simultaneously. This is possible because the MacIntosh has a separate keypad and keyboard, both of which allow data to be input to the same file. QUICKSUR stores the condition survey data on the MacIntosh's 400k 3.5 inch disks.

How to Run the Program

In order to run QUICKSUR the following steps must be performed:

- (1) Turn the MacIntosh on if it's not already on. An icon representing a MacIntosh disk appears on the screen. The blinking question mark shows that the MacIntosh is ready for you to insert a disk.
- (2) Insert the disk named "QSII", which contains the QUICKSUR program, MS-BASIC and the SYSTEM FOLDER. A message appears welcoming you to the MacIntosh. Wait for a screen similar to that shown in Fig A.1.
- (3) Using the mouse, place the arrow on the QSII icon and click the mouse button twice in quick succession. Now the screen should look like Fig A.2.
- (4) To run QUICKSUR: Position the arrow on the "QS" icon (named after QUICKSUR) and again double click the mouse button. The result is shown in Fig A.3.

Hereafter, the program itself will give you instructions and prompt you for information. Figures A.4 to A.11 illustrate the use of QUICKSUR for

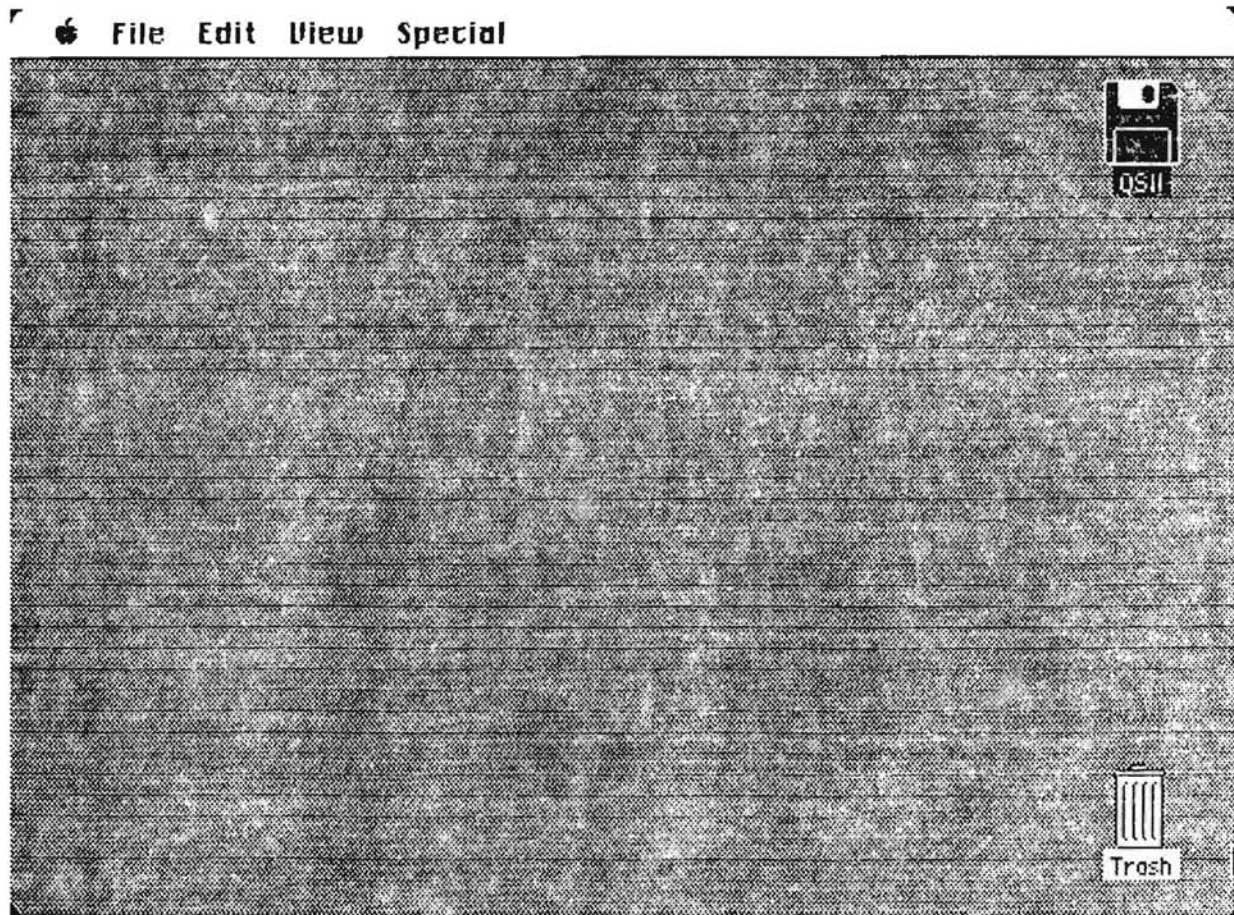


Fig A.1. This is the MacIntosh "desktop". The icon on the top right represents the disk "QSII" you inserted.

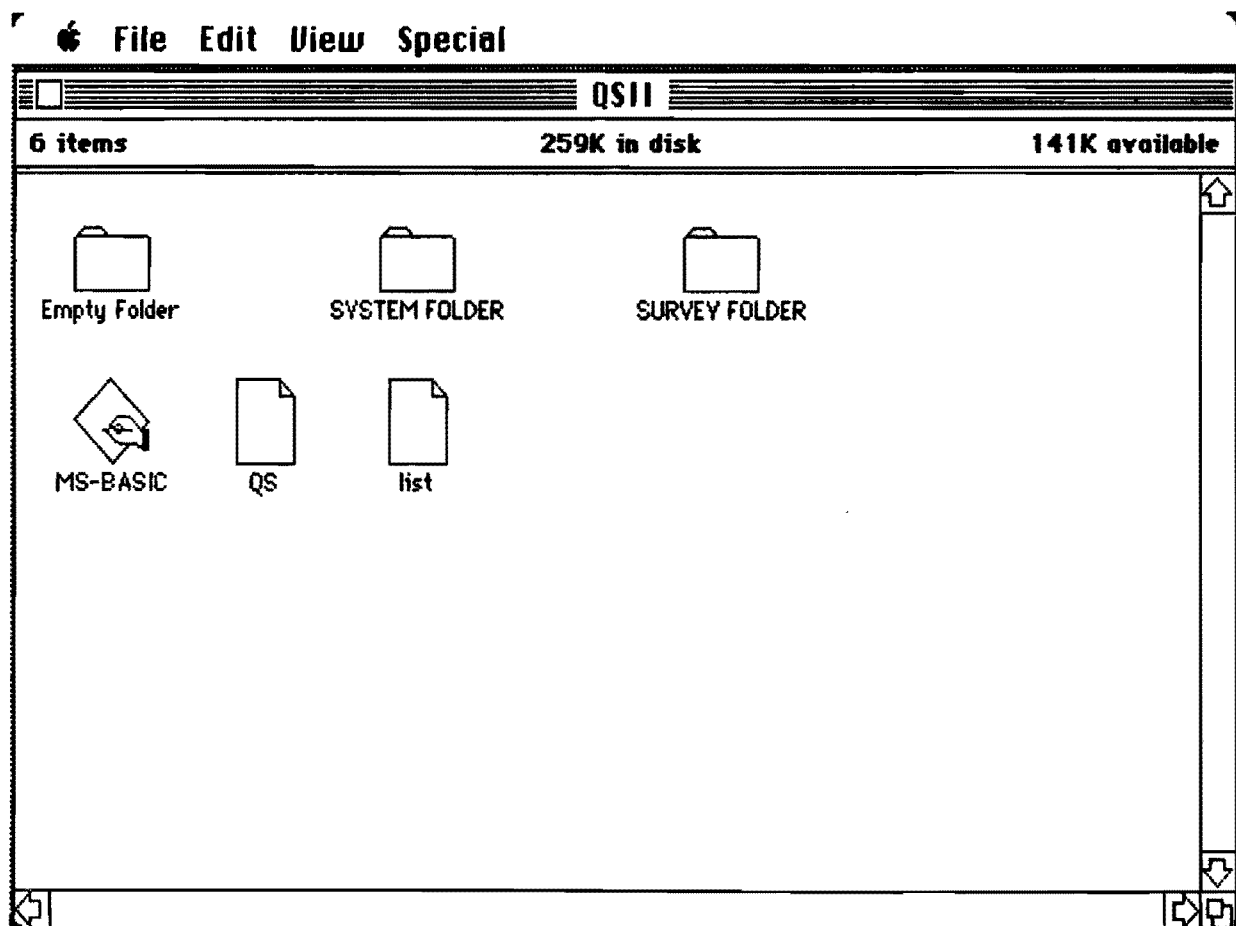


Fig A.2. This screen displays a directory of icons that represent the contents of the disk "QSII".

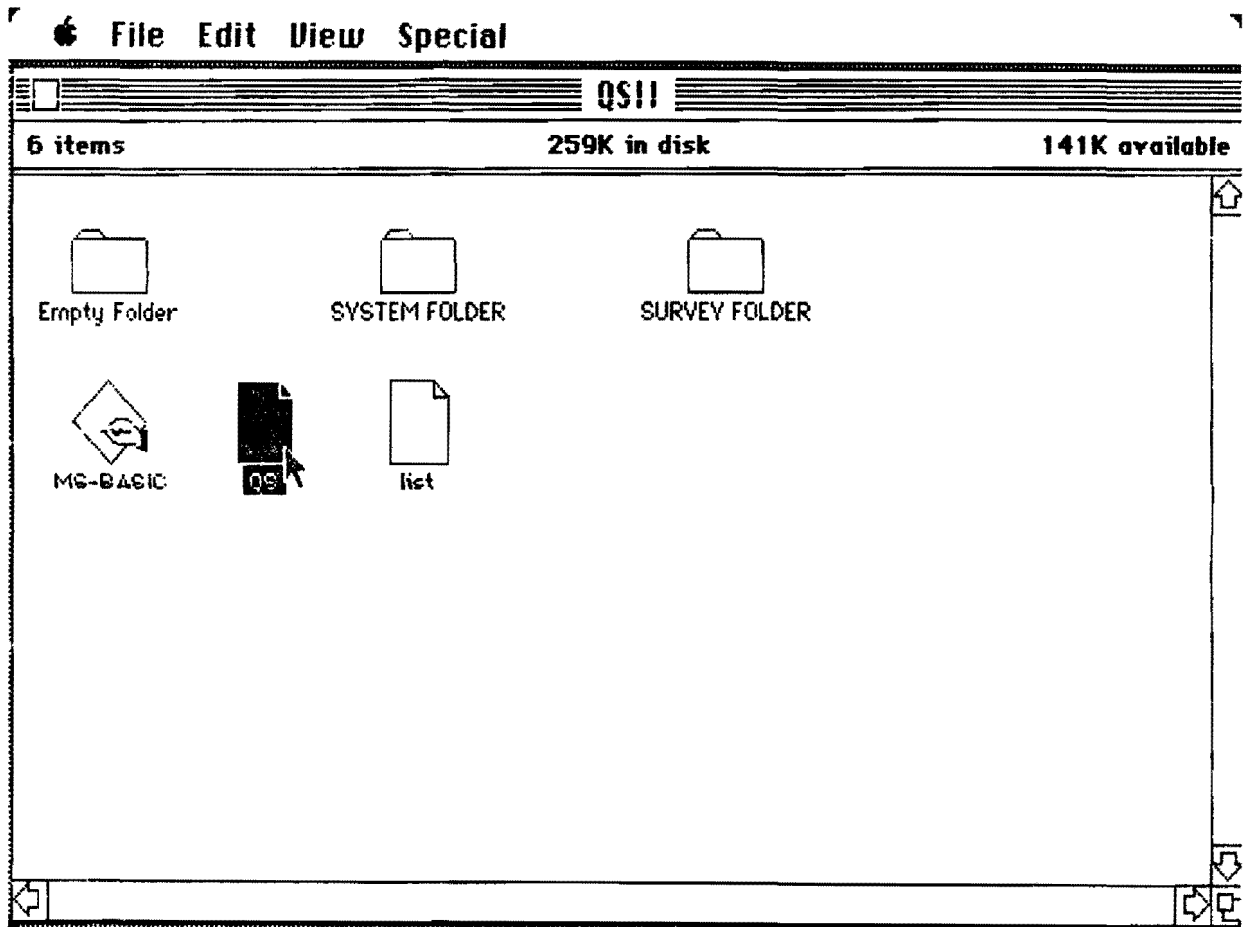


Fig A.3.

File Edit Control

QS

WELCOME TO QUICKSUR
THIS IS A PROGRAM TO AUTOMATE THE ENTRY OF CONDITION
SURVEY DATA FOR CRCP PAVEMENTS AND JCP PAVEMENTS.

****NOTE****
DO NOT INCLUDE A COMMA(,) IN ANY OF YOUR RESPONSES

ENTER THE NAME OF THE FILE TO STORE THE DATA:? 19019 WB
IS THIS A NEW FILE (Y OR N) :? Y
ENTER DISTRICT (JCP-3 CHARS, CRCP-5 CHARS) :? 19
ENTER CONTROL (JCP-4 CHARS, CRCP-10 CHARS) :? 610
ENTER SECTION (JCP-3 CHARS, CRCP 5 CHARS) :? 5
ENTER COUNTY (JCP-20 CHARS, CRCP-13 CHARS) :? BOWIE
ENTER JOB (JCP-3 CHARS, CRCP-5 CHARS) :? 4
ENTER DATE AS MM-DD-YYYY (10 CHARS) :? 11-30-84
ENTER LOCATION FROM (JCP-40 CHARS,CRCP-30 CHARS) :? .34 MI W. FM 44

Fig A.4.

File Edit Control

CRCP MAJOR

ENTER THE NAME OF THE FILE TO STORE THE DATA:? 19019 WB
IS THIS A NEW FILE (Y OR N) :? Y
ENTER DISTRICT (JCP-3 CHARS, CRCP-5 CHARS) :? 19
ENTER CONTROL (JCP-4 CHARS, CRCP-10 CHARS) :? 610
ENTER SECTION (JCP-3 CHARS, CRCP 5 CHARS) :? 5
ENTER COUNTY (JCP-20 CHARS, CRCP-13 CHARS) :? BOWIE
ENTER JOB (JCP-3 CHARS, CRCP-5 CHARS) :? 4
ENTER DATE AS MM-DD-YYYY (10 CHARS) :? 11-30-84
ENTER LOCATION FROM (JCP-40 CHARS,CRCP-30 CHARS) :? .34 MI W. FM 44
ENTER LOCATION TO (JCP-40 CHARS, CRCP-25 CHARS) :? W. OF ST 98 OV PASS
ENTER RATERS (10 CHARS) :? RY-TI-DA
ENTER BEGINNING MILE POST:? 198.0
ENTER I OR D FOR INCREASING OR DECREASING MILEPOSTS :? D
WHICH TYPE TO SURVEY, JCP OR CRCP:? CRCP
ENTER HIGHWAY AND DIRECTION (23 CHARS) :? IH 30 WB
ENTER CTR NUMBER (5 CHARS) :? 19019

Fig A.5.

File Edit Control

CRCP MAJOR

1)	DISTRICT	- 19
2)	CONTROL NUMBER	- 610
3)	SECTION NUMBER	- 5
4)	HIGHWAY AND DIRECTION	- IH 30 WB
5)	COUNTY	- BOWIE
6)	JOB NUMBER	- 4
7)	CTR NUMBER	- 19019
8)	DATE	- 11-30-84
9)	LOCATION FROM	- .34 MI W. FM 44
10)	LOCATION TO	- W. OF ST 98 OV PASS
11)	RATERS	- RY-TI-DA
12)	BEGINNING MILEPOST	- 198
13)	INC OR DEC MILEPOSTS	- D
14)	FILE TO HOLD DATA	- 19019 WB

DO YOU WISH TO CHANGE ANY OF THESE (Y OR N)? N

Fig A.6.

File Edit Control

CRCP MAJOR

11)	RATERS	- RY-TI-DA
12)	BEGINNING MILEPOST	- 198
13)	INC OR DEC MILEPOSTS	- D
14)	FILE TO HOLD DATA	- 19019 WB

DO YOU WISH TO CHANGE ANY OF THESE (Y OR N)? N

THE FOLLOWING ITEMS NEED TO BE COUNTED:

ITEM	RECOMMENDED RATER	KEY	
		INC	DEC
SEVERE SPALLING	RATER 1 ON KEYPAD	5	8
SEVERE PUNCHOUTS	RATER 1 ON KEYPAD	6	9
A/C PATCHES	RATER 2 ON KEYBOARD	`	-
P/CC PATCHES	RATER 2 ON KEYBOARD	1	!
FAILED PATCHES	RATER 2 ON KEYBOARD	2	@

PRESS ANY KEY TO CONTINUE...

Fig A.7.

File Edit Control

CRCP MAJOR

D DONE - END DATA ENTRY
 0(ZERO) CONTROL KEY - UPDATE
 B BRIDGE COMMENT
 R RAMP COMMENT
 O(OH) OVERLAY COMMENT
 C HALT ENTRY TO ENTER 16 CHAR CMT
 X RESET MILEPOST TO BACKUP OR SKIP AHEAD

YOU MAY NOW CHOOSE TO TAKE ONE OF THE FOLLOWING
 ACTIONS:

1 - MAKE A SINGLE CYCLE TEST RUN
 2 - BEGIN ACTUAL SURVEY COLLECTION
 3 - ABORT THIS PROGRAM

ENTER YOUR CHOICE (1, 2 OR 3):
 ? 2

Fig A.8.

File Edit Control

CRCP RUN

ENTER YOUR CHOICE (1, 2 OR 3):
 ? 2

19	610	5	IH 30 WB	BOWIE	4
	.34 MI W. FM 44			W. OF ST 98 OV PASS	RY-

SEVERE SPALL INC	- 5	SEVERE SPALL DEC	- 8
SEV PUNCHOUTS INC	- 6	SEV PUNCHOUTS DEC	- 9
A/C PATCH INC	- `	A/C PATCH DEC	- "
P/CC PATCH INC	- 1	P/CC PATCH DEC	- !
FAILED PATCHES INC	- 2	FAILED PATCHES DEC	- @

COMMENTS :

BRIDGE	- B	OVERLAY	- 0
RAMP	- R	HALT SURVEY TO ENTER OWN	- C

CONTROL AND UPDATE KEY - 0 (ZERO)
 END OF SURVEY KEY - D
 RESET MILE POST KEY - X
 BEGIN

Fig A.9.

File Edit Control

CRCP RUN						
RESET MILE POST KEY						
BEGIN						
198.0	RAMP	16	15	14	16	12
197.6		14	17	14	12	11
197.2		17	19	13	15	15
196.8		6	6	15	12	17
196.4		31	1	14	11	10
196.0		6	15	2	1	0
195.6		39	28	0	1	0
195.2	BRIDGE	33	0	14	16	2
194.8		21	6	6	5	0
194.4		4	0	15	15	13
194.0		22	0	1	7	14
193.6		17	0	0	0	0
ENTER UP TO A 16 CHARACTER COMMENT:						
? 15 FT O-LAY						
CONTINUE						

Fig A.10.

File Edit Control

CRCP RUN						
ENTER UP TO A 16 CHARACTER COMMENT:						
? 15 FT O-LAY						
CONTINUE						
193.2	15 FT O-LAY	0	0	0	0	0
192.8		36	9	4	5	0
192.4		0	0	0	0	0
192.0		17	0	0	0	0
191.6		25	2	3	3	0
191.2		27	7	16	15	0
190.8	BRIDGE	34	3	11	10	0
190.4		28	2	3	6	8
190.0		16	0	23	20	0
189.6		34	7	15	16	5
189.2		24	2	18	16	5
188.8		25	0	20	13	3
188.4		25	6	18	15	8
188.0		23	11	17	10	12

Fig A.11.

entering data with a sample run of the program. The following figures correspond to the run of section 19019 WB in District 19.

At the end of the run, a new file, "19019 WB", is created with the new survey data corresponding to that section. The new file is now part of the directory of icons which represents the contents of the disk "QSII". This is shown in Fig A.12.

The program QUICKSUR (named QS on the disk QSII) can be run as many times as desired, provided that there is space in the disk for the new files with the new condition survey data. To run the program again, repeat step 4.

To see the contents of the new file 19019 WB on the screen, run the basic program "list" in the same manner that QUICKSUR was run (i.e., repeat step 4, but use the icon names list). The program list will prompt you for the name of the file to list on the screen.

After all sections of the survey have been completed, there should be as many new files with survey data as the number of sections that were surveyed (this is the same as the number of times the program was run).

Follow steps 5 and 6 to conclude the procedure.

- (5) Position the arrow on the menu title "file" in the menu bar. Press the mouse button and hold it down while you drag the arrow to the words "close all", and then release the mouse button. This will close all the files in the disk. Fig A.13 illustrates these instructions.
- (6) Finally to eject the disk with the new survey data, repeat instructions in step 5 but this time drag the arrow to the word "eject" instead of to "close all" when selecting under the file menu. Refer to Fig A.14 for an illustration of the instruction.

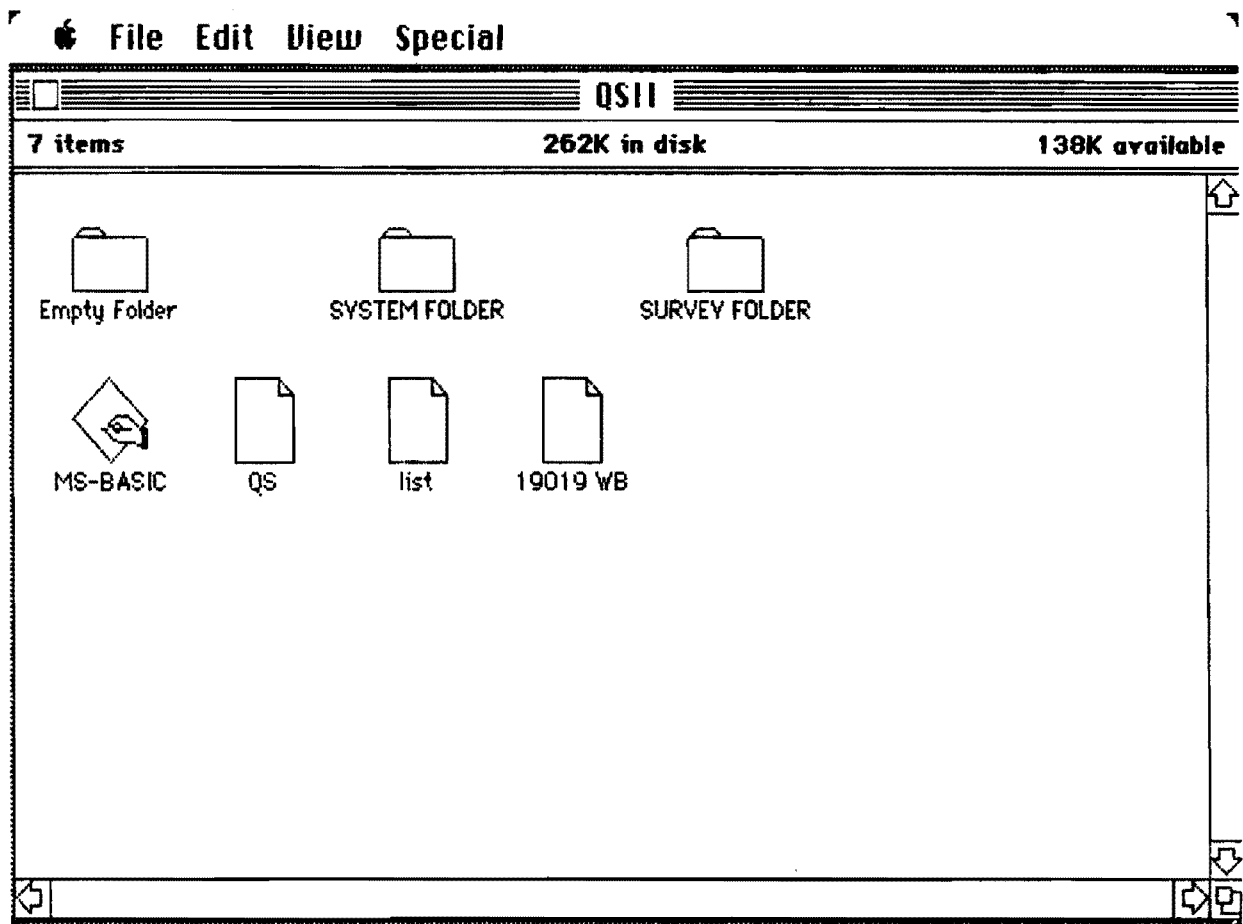


Fig A.12.

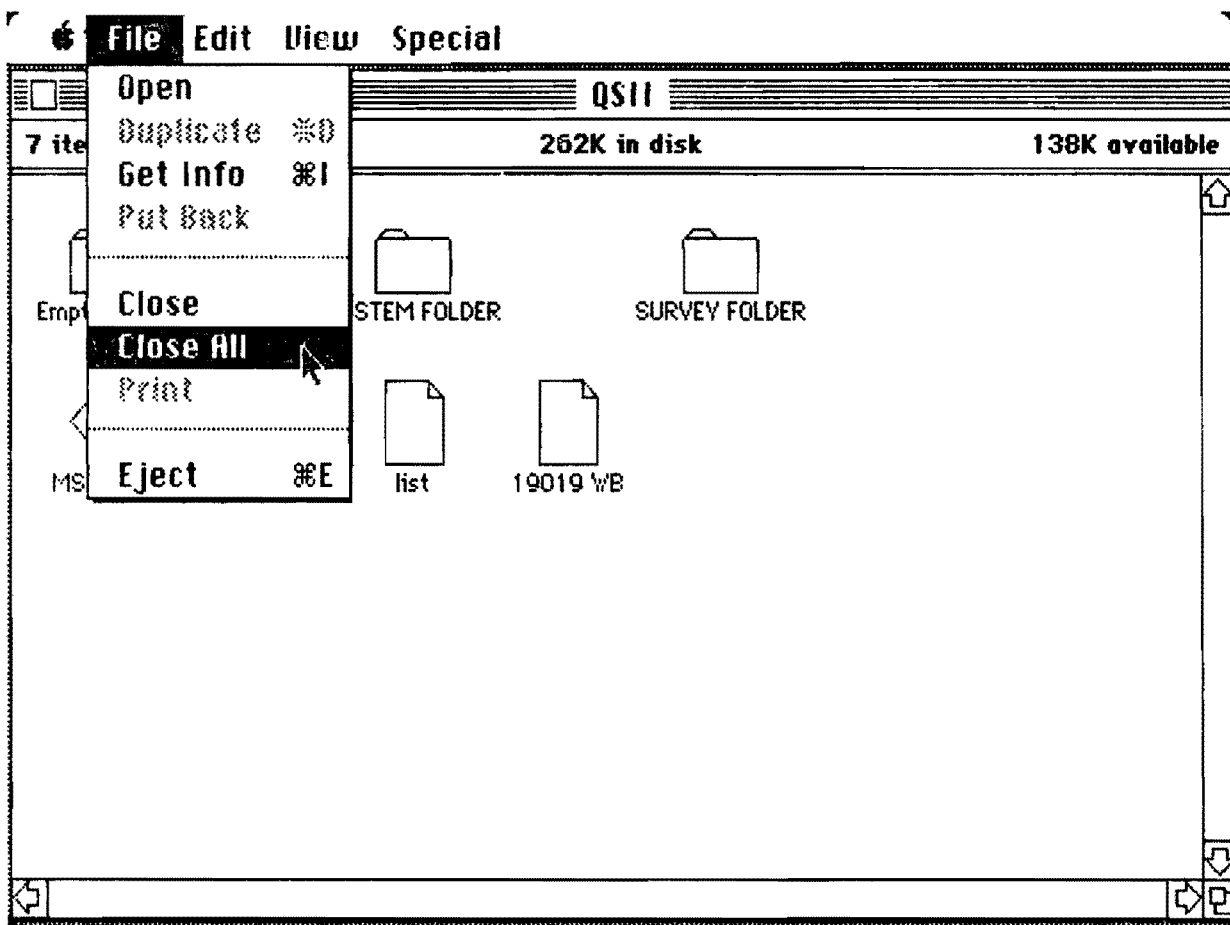


Fig A.13.

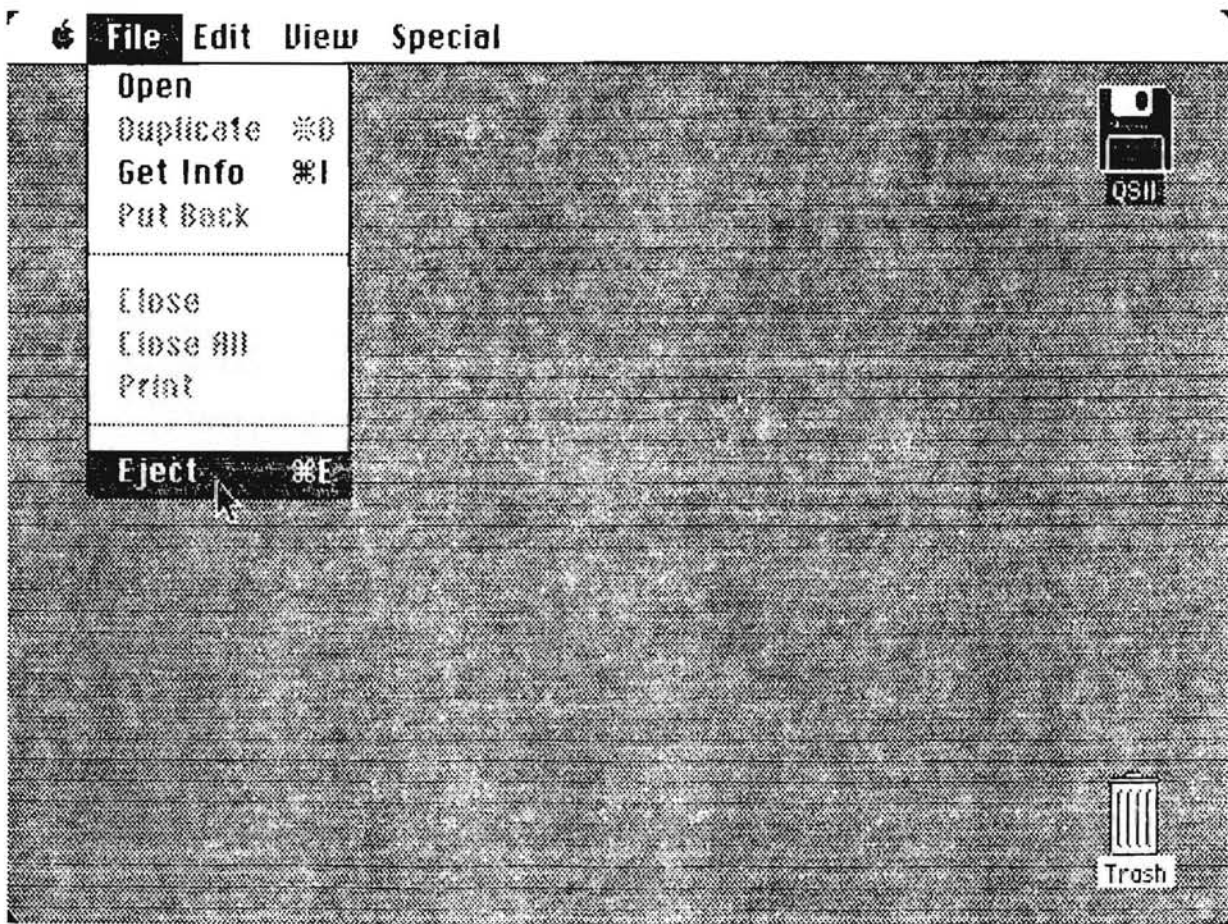


Fig A.14.