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Materials Report

WA-RD-117.1

Asphalt Concrete Class D

Bridge Deck Overlays

Data and Comment

Materials Office

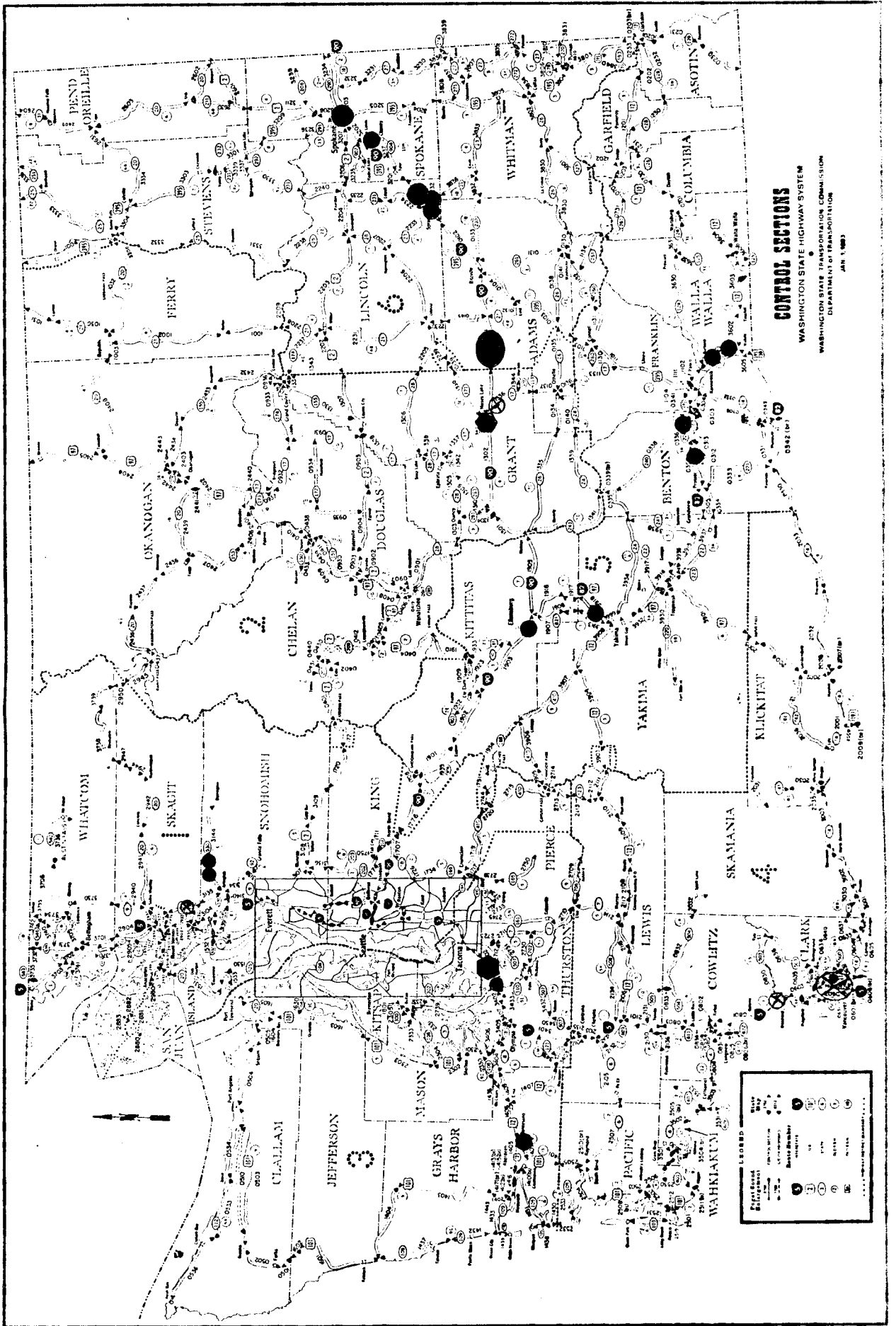


Washington State
Department of Transportation

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● Bridges Inspected - indicates one or more

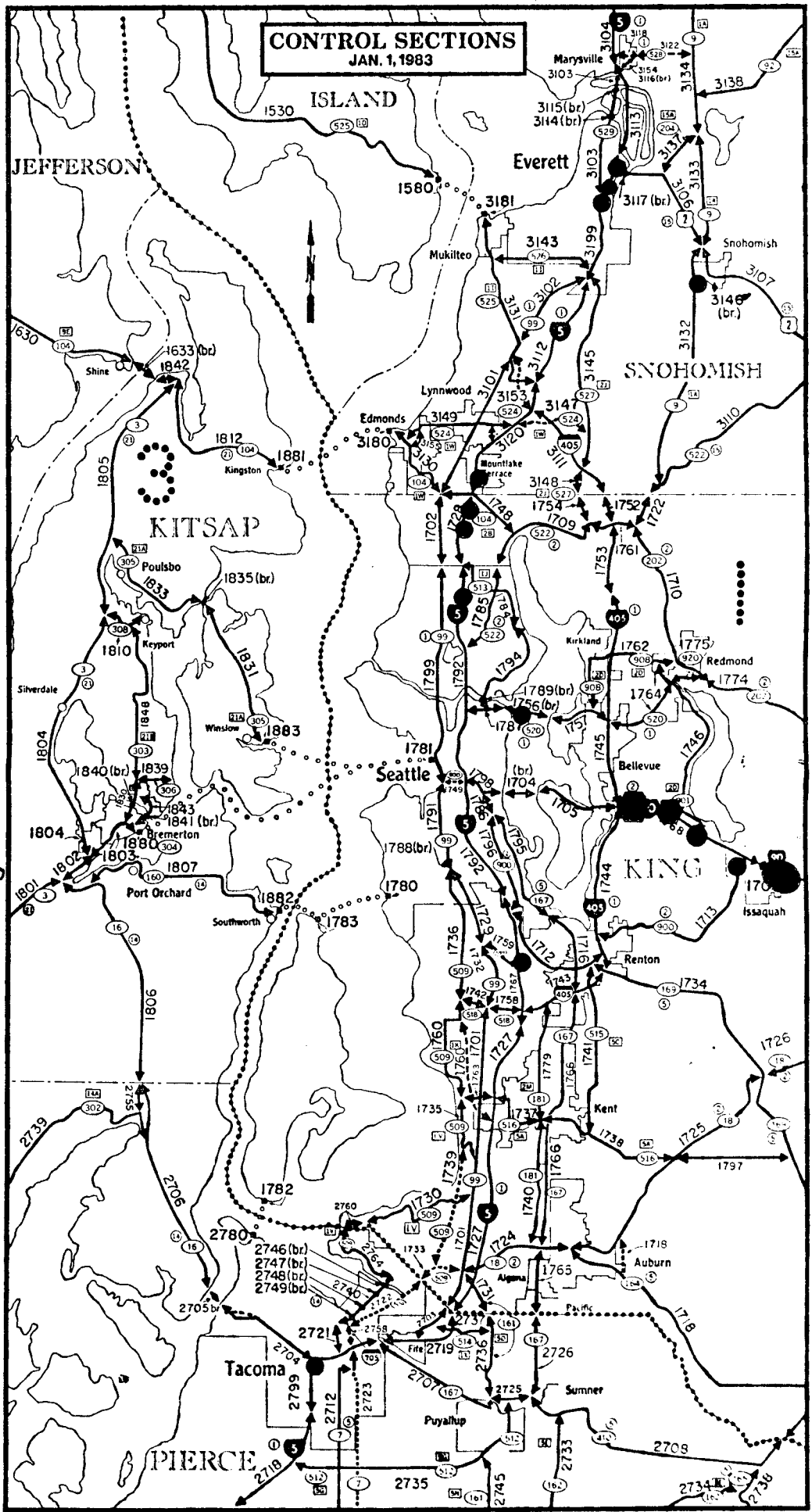


LEGEND

●	Bridges Inspected - indicates one or more
○	Interstate
○	State Route
○	County Route
○	Local Road
○	Control Section
○	City
○	Town
○	Village
○	Unincorporated Area
○	Water
○	Forest
○	Public Lands
○	Private Lands
○	Indian Lands
○	Other

CONTROL SECTIONS
JAN. 1, 1983

● Bridges Inspected - indicates one or more



INTRODUCTION

This study was conducted to determine the wear characteristics of bridge decks overlaid with Class D (open-graded) asphalt concrete. A total of 74 bridges were inspected and rated during the period May to August, 1984.

A rating system was developed to allow a numerical comparison between bridges, and also to establish levels of tolerable deficiencies. Values for a variety of problem areas were assigned in ascending order according to severity. Refer to page 10 for deficiency rating values.

To use the system the bridge deck is inspected and values assigned according to visual observations. For example, if a bridge deck had some raveling, severe rutting and a transverse crack at the expansion joint, a rating of 5 (some raveling) + 6 (severe rutting) + 2 (transverse expansion joint crack) = 13 would be applied.

To further clarify the rating system used on page 4 through 9 under the column headed "Class of Defects", the following examples are used.

1. On page 4, Bridge No. 5/525.5 E had a rating of 1-4-5. The rating total would be $1+4+5 = 10$, which is listed in the column headed "Rating".
2. On page 5, Bridge No. 5/599 W had a rating of B-4. The rating total would be B (expansion dam failure) + 4 (some rutting). Since there is no numerical value for B the total is 4, which is listed in the column headed "Rating".

After comparing the ratings of all 74 bridges, three levels of serviceability were established, Categories A, B, and C, which are discussed in detail in the memo of August 13, 1984, on page 2.

Photo Examples

Rating 0 - Category A - Bridge No. 90/59 E-N - page 35

Rating 2 - Category A - Bridge No. 530/124 - pages 51-52

Rating 6 - Category B - Bridge No. 5/534 - page 13

Rating 10 - Category B - Bridge No. 5/525.5 E - page 15

Rating 21 - Category C - Bridge No. 90/540 N - pages 46-47



Washington State
Department of Transportation

INTRA-DEPARTMENTAL COMMUNICATION

DATE: August 13, 1984

FROM: R. Schultz/R. Allison

PHONE:

SUBJECT: Open Graded Bridge
Deck Overlays

TO: R.H. Gietz

Per your request of June, 1984, we have completed a field survey of open graded asphalt concrete bridge deck overlays. A rating system was developed to facilitate assigning a numerical value to each bridge. The rating value considers such things as cracking, rutting, raveling, surface texture and break-up. The values range from zero to 27. Zero represents a bridge with a virtually unblemished deck surface.

The final ratings were divided into three categories. Category A represents bridge ratings of five or less and are considered to be in near perfect condition. Some minor defects may be noted but are not considered detrimental to the serviceability of the deck. Category B represents ratings in the range of 6 to 10. These indicate potential problems that may require attention in the near future. Category C represents ratings of 11 and greater. Bridges in this category require immediate action to prevent failure of the deck overlay.

A total of 72 bridges were examined. Of these, 86% fell in category A, 8% in category B and 6% in category C. The category C bridges were all in Spokane and it is our supposition that conditions at time of placement are the primary cause of failure.

The Duwamish River bridges cited in J.R. Stephenson's IDC of May 30, 1984, were not inspected. This was due to the method used to identify which bridges had received open graded overlays. That is, we used asphalt mix designs as an identifier. Apparently the Duwamish bridges did not receive a mix design.

The Snohomish River bridges, also cited in Stephenson's IDC, were inspected. Our observations were not as critical as his, however, these bridges were placed in category B.

With one exception, all of the bridges in categories B and C are subject to extremely heavy, high volume, high speed traffic. On the other hand, a great many category A bridges are subject to the same conditions.

In conclusion, none of the problems observed could be attributed to the open graded asphalt mix. Rather, most of the problems seem to emanate from the substrate and would be present regardless of the class of asphalt overlay. Typical deck surfaces are presented in the following photo section.

RS:tlw
RA



**Washington State
Department of Transportation**

INTRA-DEPARTMENTAL COMMUNICATION

DATE: September 10, 1984

FROM: R. Schultz/R. Allison

PHONE:

SUBJECT: Open-Graded Bridge Deck Overlays
Follow-up

TO: R. H. Gietz

The Duwamish River Bridge on SR-5 in Seattle and the Port Washington Bridge on SR-303 in Bremerton were recently rated as to deck condition and are now included in the deck study previously submitted.

The Duwamish Bridge is experiencing severe ravelling in the left wheel path in three of four lanes. We speculate that this was caused by improper compaction techniques when the deck was overlaid. The ravelled areas have been repaired and are holding up well. This bridge was rated 11.

The Port Washington Bridge shows little sign of distress. There is some minor rutting at the joints in the truss span but none in the approach spans. The grout material placed at the expansion joints in the truss span is breaking up. This bridge was rated 7. The basis for the seemingly poor rating was a closed surface texture which is to be expected in an overlay of this vintage.

Our previous conclusions remain unchanged. A summary of all bridge ratings and photos of the bridges noted above are added for your reference.

RS/RA:db

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Project: ACP Class D Bridge Decks

Sheet No. 1 of

Bridge No.	M.P.	Contract No.	Year	Date Inspected	Comments and *Class of Defects	Photo Page	Rating
5/18 E	4.38	2591	84	6/14/84	Not overlayed yet		-
5/18 W	4.38	2591	84	6/14/84	Not overlayed yet		-
5/20 E	5.40	2591	84	6/14/84	Not overlayed yet		-
5/20 W	5.40	2591	84	6/14/84	Not overlayed yet		-
5/22 E	6.32	2591	84	6/14/84	Not overlayed yet		-
5/22 W	6.32	2591	84	6/14/84	Not overlayed yet		-
5/25 E	7.48	2591	84	6/14/84	Not overlayed yet		-
5/25 W	7.49	2591	84	6/14/84	Not overlayed yet		-
5/102 E	21.08	2608	84	6/14/84	Not overlayed yet		-
5/102 W	21.08	2608	84	6/14/84	Not overlayed yet		-
5/407	118.33	1848	80	7/3/84	0-1		1
5/409	119.38	1848	80	7/3/84	0-1		1
5/411 E	120.57	1848	80	7/3/84	0-1	12	1
5/411 W	120.57	1848	80	7/3/84	0-1		1
5/433	132.10	1250	79	7/3/84	2-4	12	6
5/434	132.10	1250	79	7/3/84	2-4	13-14	6
5/525.5 E	155.97	2291	82	7/3/84	1-4-5	14-15	10

*See Page 10

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Project: ACP Class D Bridge Decks

Sheet No. 2 of

Bridge No.	M.P.	Contract No.	Year	Date Inspected	Comments and *Class of Defects	Photo Page	Rating
5/588 E	172.76	2197	83		Not looked at		NR
5/588 W	172.76	2197	83	6/29/84	0-5	16	5
5/595 E	176.13	2283	83		Not looked at		NR
5/595 W	176.13	2283	83	6/29/84	0-5		5
5/599 W	177.43	2283	83	6/29/84	B-4	17	4
5/602	178.27	2323	83	6/29/84	B-O	18-19	0
5/626 E	191.52	2509	83		Not looked at		NR
5/626 W	191.52	2509	83	6/29/84	0-4	20	4
5/628 W	192.31	2509	83	6/29/84	0-4	21	4
5/645 E	194.81	2292	82	6/29/84	4-5	23-24	9
5/645 W	194.81	2292	82	6/29/84	4-5	22	9
9/117	8.88	2359	82	7/3/84	0-5	25	5
9/205	43.70	2561	83		Changed to Class B by Change Order		-
12/427	279.98	2339	82	6/7/84	0-4	25-26	4
12/603	299.72	2270	82	6/7/84	0		0
12/606	303.56	2270	82	6/7/84	0-1	26-27	1
17/210	50.74	2483	83	6/5/84 RG	Class B		-

*See Page 10

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Project: ACP Class D Bridge Decks

Sheet No. 3 of

Bridge No.	M.P.	Contract No.	Year	Date Inspected	Comments and *Class of Defects	Photo Page	Rating
23/105	43.13	2293	82	6/6/84	0	28	0
23/106	43.20	2293	82	6/6/84	0	28	0
82/114 N	30.77	2318	83	6/7/84 Plus Ride	0-4		4
82/115 N	30.90	2318	83	6/7/84	0-4	29	4
90/47 E-N	9.74	2406	83		Not looked at		NR
90/48 W-S	9.74	2406	83	6/29/84	0		0
90/48 W-N	9.74	2406	83		Not looked at		NR
90/50 S	9.74	2406	83	6/29/84	0 (Surface sealed w/slurry?)	30-31	0
90/50 N	9.74	2406	83	6/25/84	0	32	0
90/50 W-S	9.74	2406	83	6/29/84	0		0
90/52	11.00	2406	83	6/29/84	0	32-33	0
90/54 E-N	11.10	2406	83	6/29/84	0		0
90/54 E	11.10	2406	83	6/29/84	0		0
90/54 W	11.10	2406	83	6/29/84	0		0
90/54 S-W	11.10	2406	83	6/29/84	0	34	0
90/59 S	13.68	2406	83	6/29/84	0	35	0
90/59 N	13.68	2406	83		Not looked at		NR

*See Page 10

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Project: ACP Class D Bridge Decks

Sheet No. 4 of

Bridge No.	M.P.	Contract No.	Year	Date Inspected	Comments and *Class of Defects	Photo Page	Rating
90/59 E-N	13.68	2406	83	6/29/84	0	35	0
90/63 S	16.73	2406	83	7/3/84	0-5	36	5
90/63 N	16.73	2406	83	7/3/84	0-5		5
90/65 S	16.92	2406	83	7/3/84	0		0
90/65 N	16.92	2406	83	7/3/84	0	36	0
90/65 W-W	17.12	2406	83	7/3/84	0	37	0
90/66 S	17.12	2406	83	7/3/84	0	38	0
90/66 N	17.12	2406	83	7/3/84	0	37	0
90/68 S	18.02	2406	83	7/3/84	0-4	40	4
90/68 N	18.02	2406	83	7/3/84	0-4	59	4
90/69 W-S	18.04	2406	83	7/3/84	0-4	41	4
90/161 S	108.31	1904	80	6/5/84	1-4-5		10
90 161 N	108.30	1904	80	6/5/84	White Pavement		-
90/220 S	175.62	2483	83	6/5/84	0-1	42	1
90/220 N	175.62	2483	83	6/5/84	0-1	42	1
90/225 S	176.74	2483	83	6/5/84	0		0
90/225 N	176.74	2483	83	6/5/84	0		0

*See Page 10

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Project: ACP Class D Bridge Decks

Sheet No. 5 of

Bridge No.	M.P.	Contract No.	Year	Date Inspected	Comments and *Class of Defects	Photo Page	Rating
90/302 S	194.82	2279	82	6/5/84	0-1		1
90/302 N	194.82	2279	82	6/5/84	0-1		1
90/304 S	196.61	2279	82	6/5/84	0-1		1
90/304 N	196.61	2279	82	6/5/84	0-1		1
90/306 S	196.91	2279	82	6/5/84	0-1		1
90/306 N	196.91	2279	82	6/5/84	0-1		1
90/307 S	199.91	2279	82	6/5/84	0-1	43	1
90/307 N	199.91	2279	82	6/5/84	0-1		1
90/403 S	242.66	2058	81	6/6/84	White Top RG		-
90/403 N	242.66	2058	81	6/6/84	White Top RG		-
90/405 S	245.26	2293	82	6/6/84	0-4	43	4
90/405 N	245.26	2293	82	6/6/84	0-4	44	4
90/408 S	249.02	2293	82	6/6/84	0-1	44	1
90/408 N	249.02	2293	82	6/6/84	0-1	45	1
90/540 S	279.49	2518	83	6/6/84	6-7-8 Paved 10/83		21
90/540 N	279.49	2518	83	6/6/84	6-7-8 Paved 10/83	46-47	21
90/545	280.16	2518	83	6/6/84	6-7-8 Paved 10/83	47-48	21

*See Page 10

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Project: ACP Class D Bridge Decks

Sheet No. 6 of

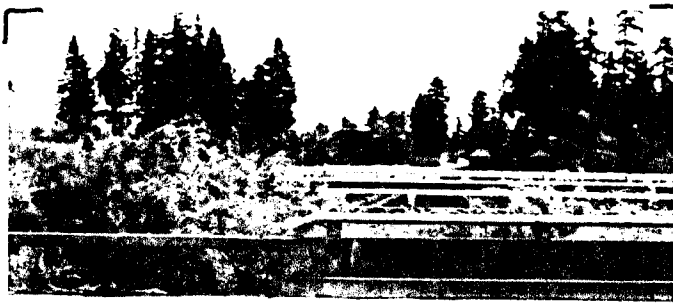
Bridge No.	M.P.	Contract No.	Year	Date Inspected	Comments and *Class of Defects	Photo Page	Rating
90/546	280.82	2518	83	6/6/84	6-7-8 Paved 10/83		21
107/4	6.82	2342	82		Timber Trestle only 0-1-2		3
171/5	0.00	2483	83	6/5/84	0-1	49	1
224/7	7.59	2339	82	6/7/84	1-3	50	4
520/8	1.63	1900	80	7/4/84	0		0
530/124	28.78	2562	83	5/31/84	B-0-2	51-52	2
530/126	32.78	2562	83	5/31/84	B-0-2		2
900/30	15.82	2406	83		Not looked at		NR
904/10	16.90	1869	80	6/6/84	0-1	53-54	1
5-526	156.34	0226	76	8/16/84	4-7	55-56	11
303/12	0.73	1261	79	8/16/84	3-4	57-58	7

*See Page 10

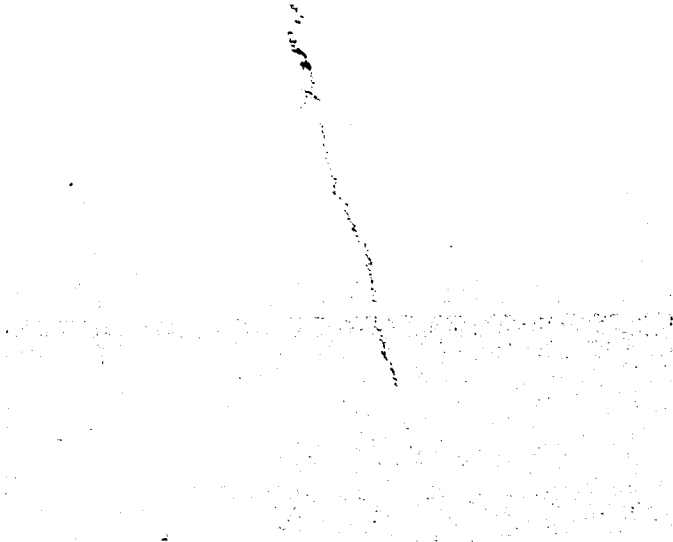
- A - Expansion Dam Set too High
- B - Expansion Dam Failure
- 0 - Surface looks good
- 1 - Traverse crack @ one or both pavement seats
- 2 - Traverse crack @ expansion joints
- 3 - Surface closed
- 4 - Some rutting
- 5 - Some raveling
- 6 - Severe rutting
- 7 - Severe Raveling
- 8 - Chuckholes

* Class of Defects as shown in columns are additive and correspond to the above definition. Discussion of rating system may be found on Page 1.

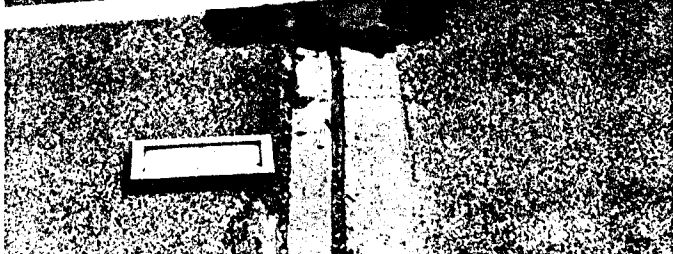
APPENDIX A

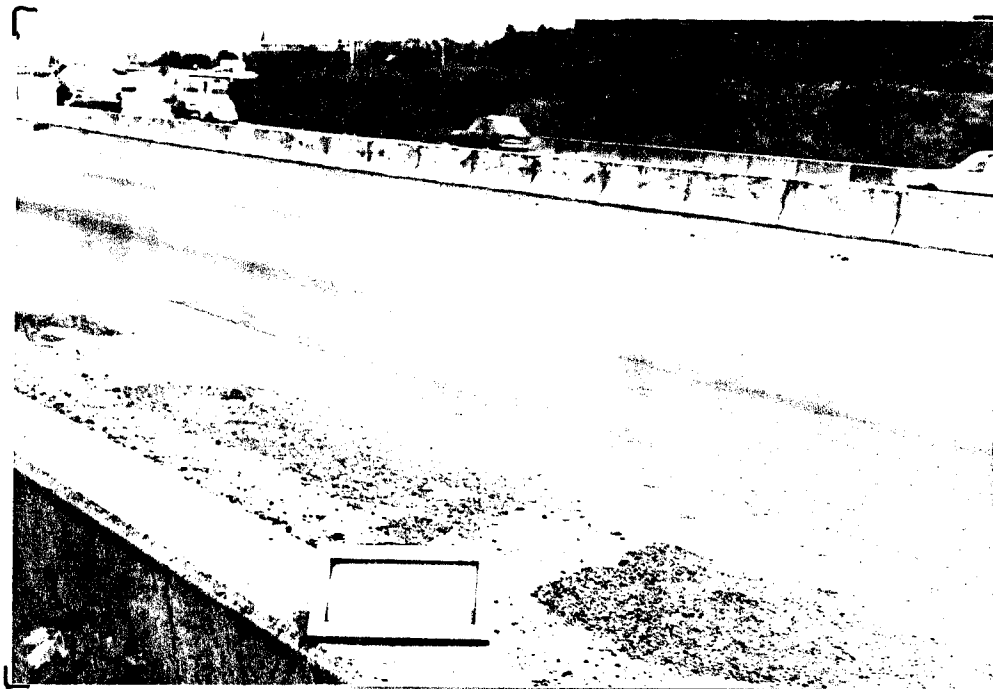


5/411 W - Surface open and shows little or no wear. Traverse cracks at pavement seats. Heavy high speed traffic. Paved 1980. Rated 1

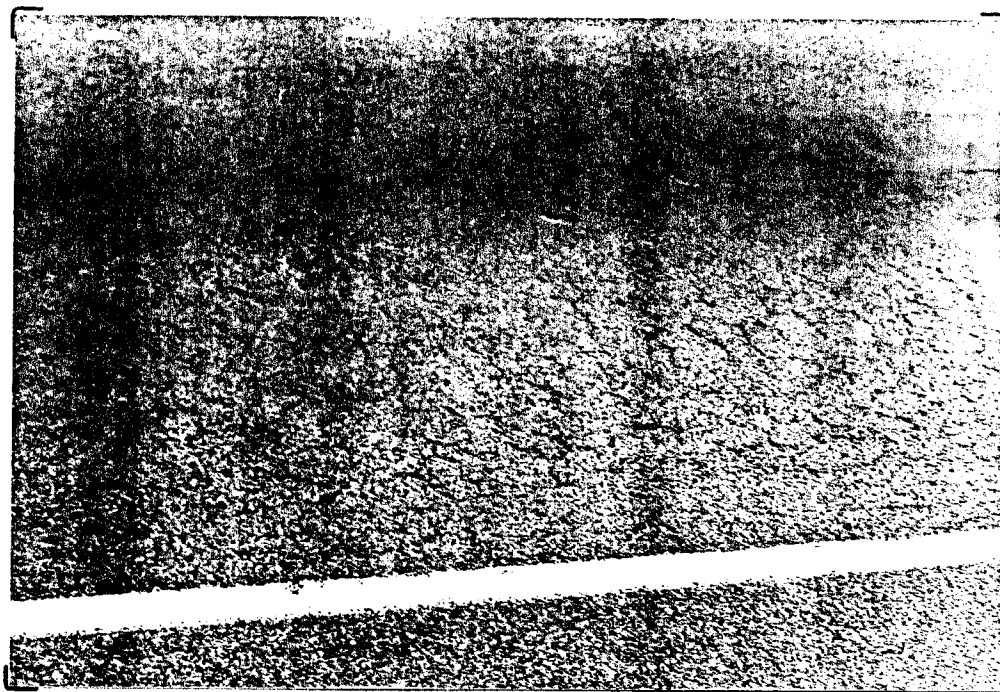


5/433 - Shows some tire wear but is in serviceable condition. Patching at pavement seat. Heavy, high speed traffic. Paved 1979. Rated 6.





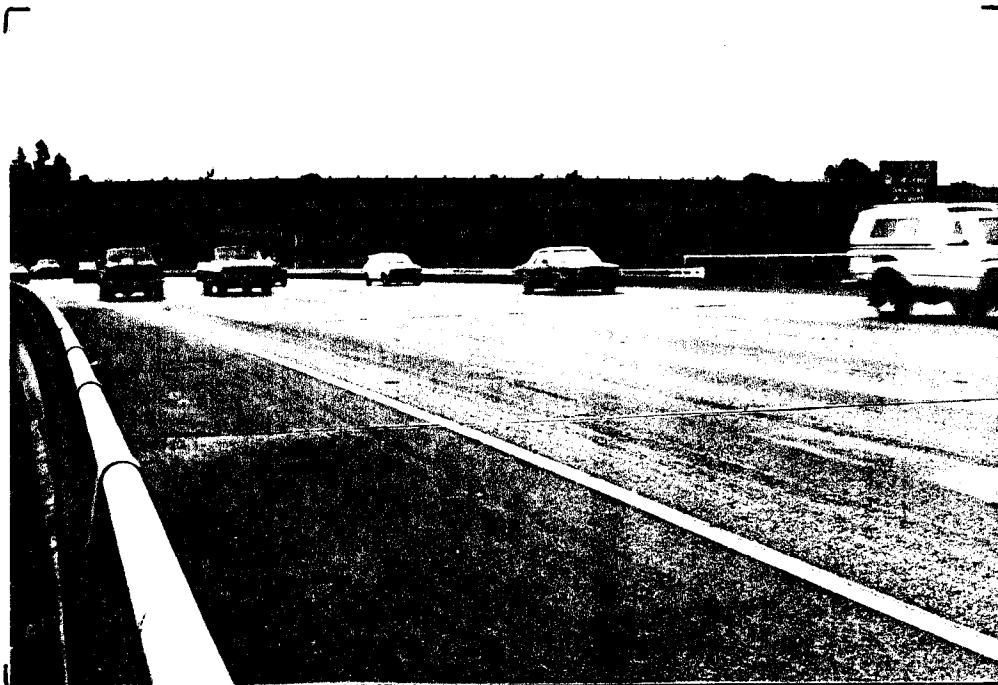
5/434 - Shows some tire wear. Some patching which appears caused by failure of the substrate. Heavy, high speed traffic. Paved 1979. Rated 6.



5/434 - Some alligator cracking in wheel path.



5/434
Cracks and patching at
pavement seat.



5/525.5 E - Surface shows some signs
of raveling and rutting. Heavy, high
speed traffic. Paved 1982. Rated 10



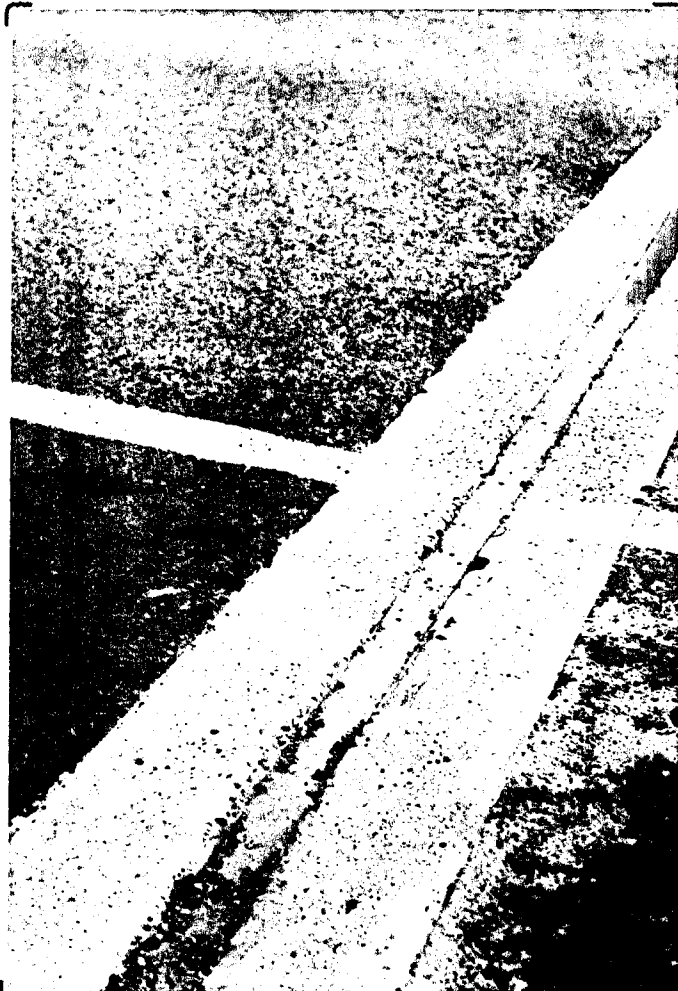
5/525.5 E -Flushing pavement at various points on the deck. Rutting can be seen at the joints.



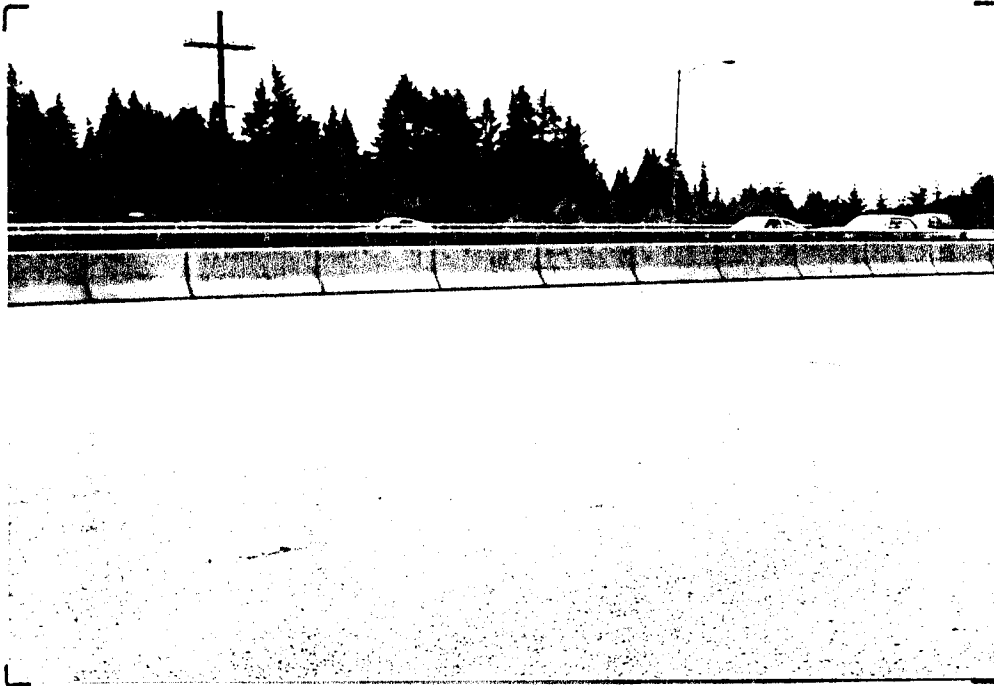
5/525.5 E - Joints at the pavement seats are breaking up.



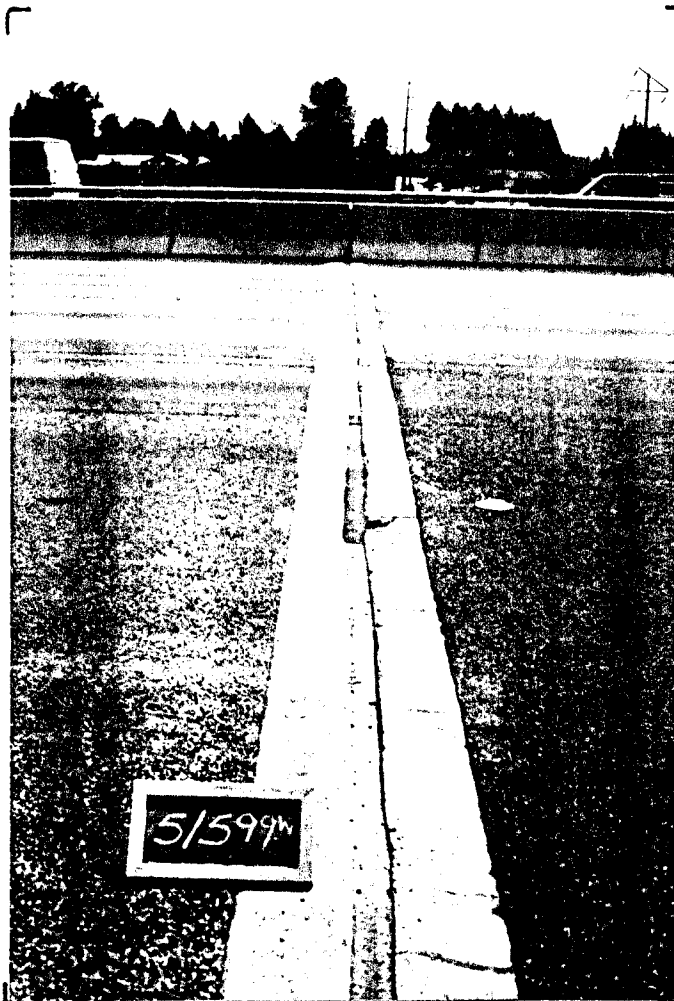
5/588 W - Surface in fair condition. Some minor signs of raveling. Heavy, high speed traffic. Pave 1983. Rated 5



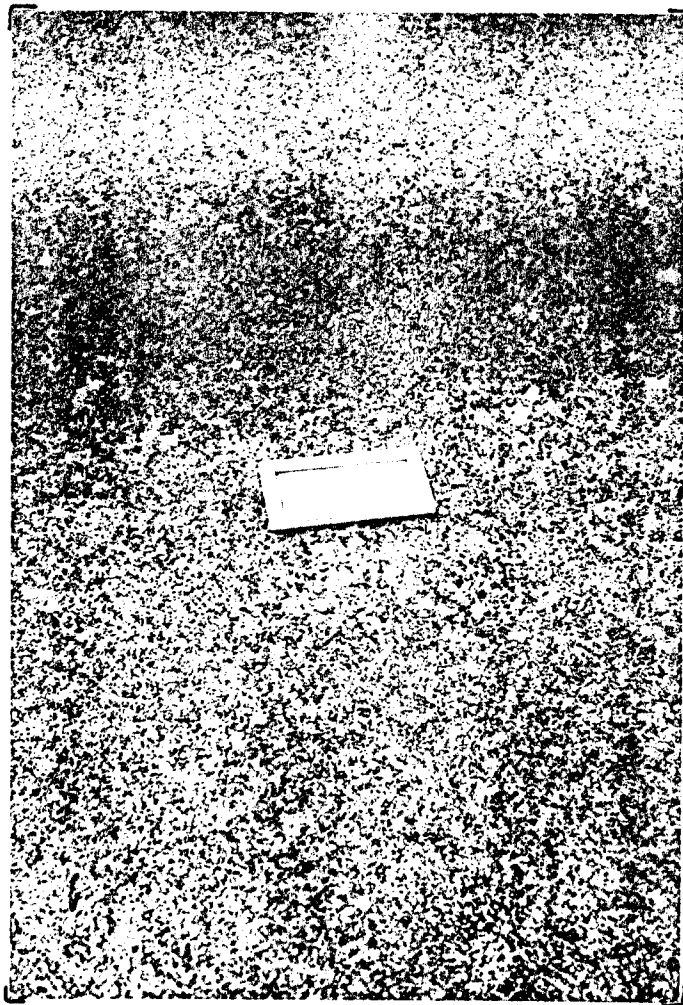
5/588 W - Joints were set too low allowing traffic to impact the overlay at the joints.



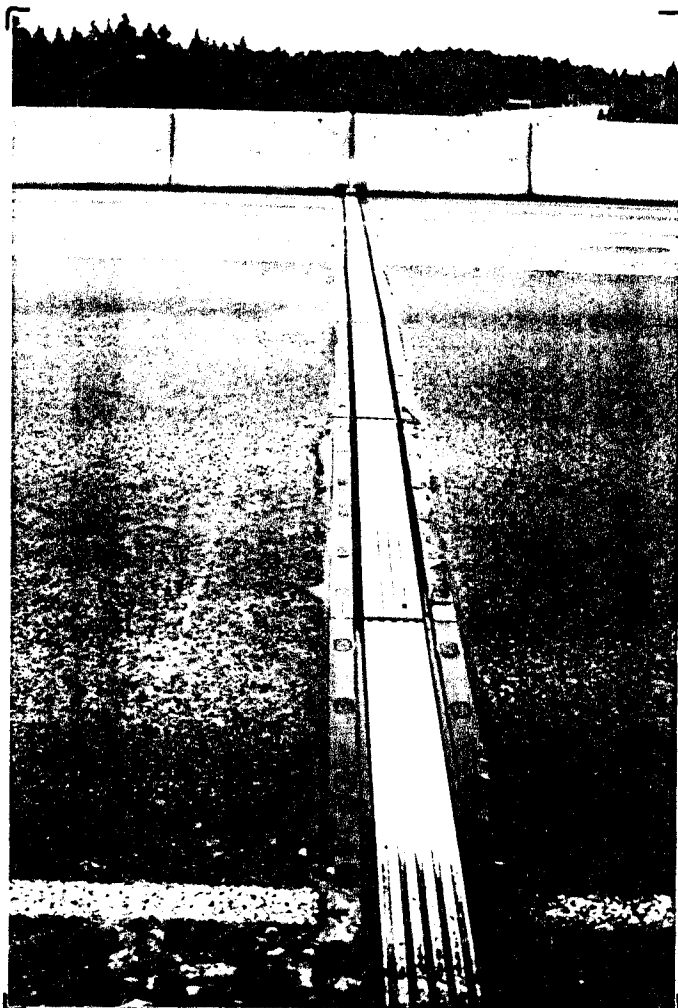
5/599 W - Surface shows some rutting and segregation in the mix at various spots. Heavy, high speed traffic. Paved 1983. Rated 4



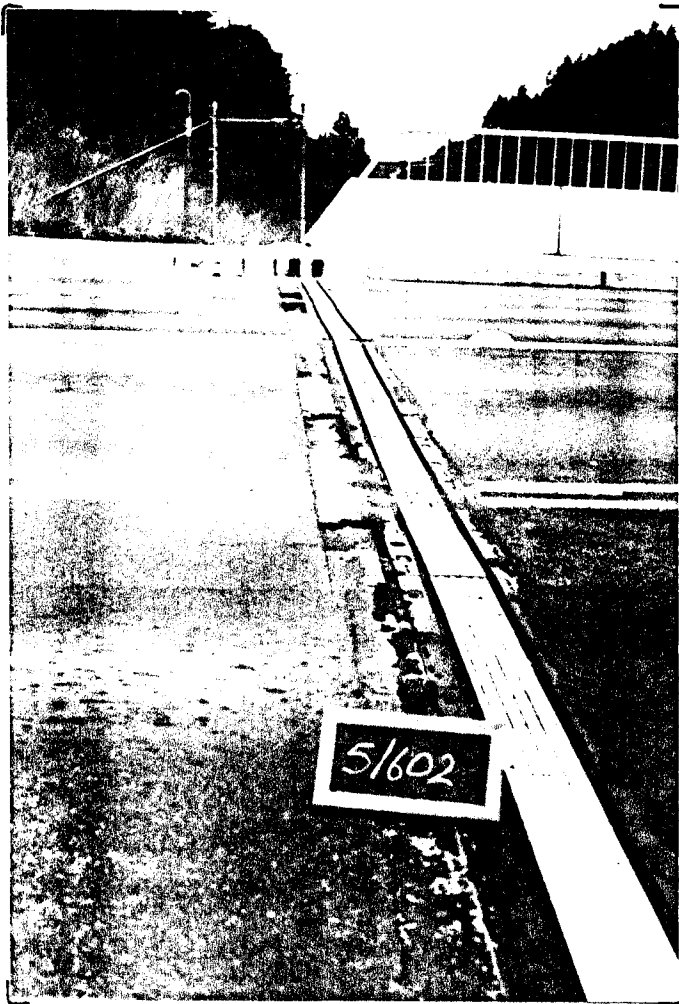
5/599 W - Rutting particularly noticeable at the joints.



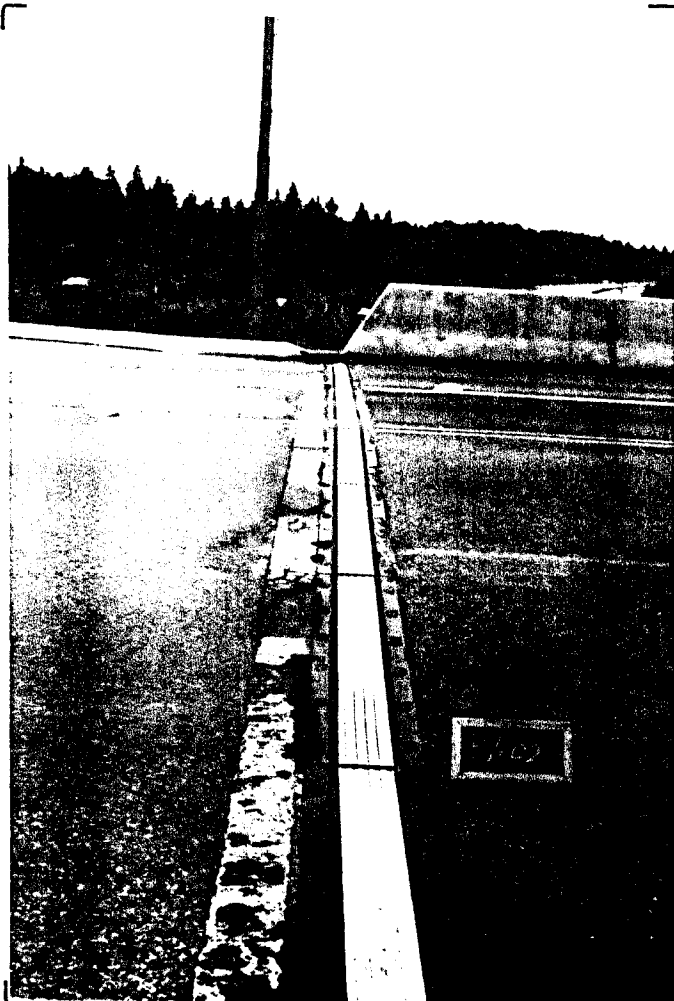
5/602 - Surface open and shows little or no wear. Moderate to light slow speed traffic. Pave 1983. Rated 0.



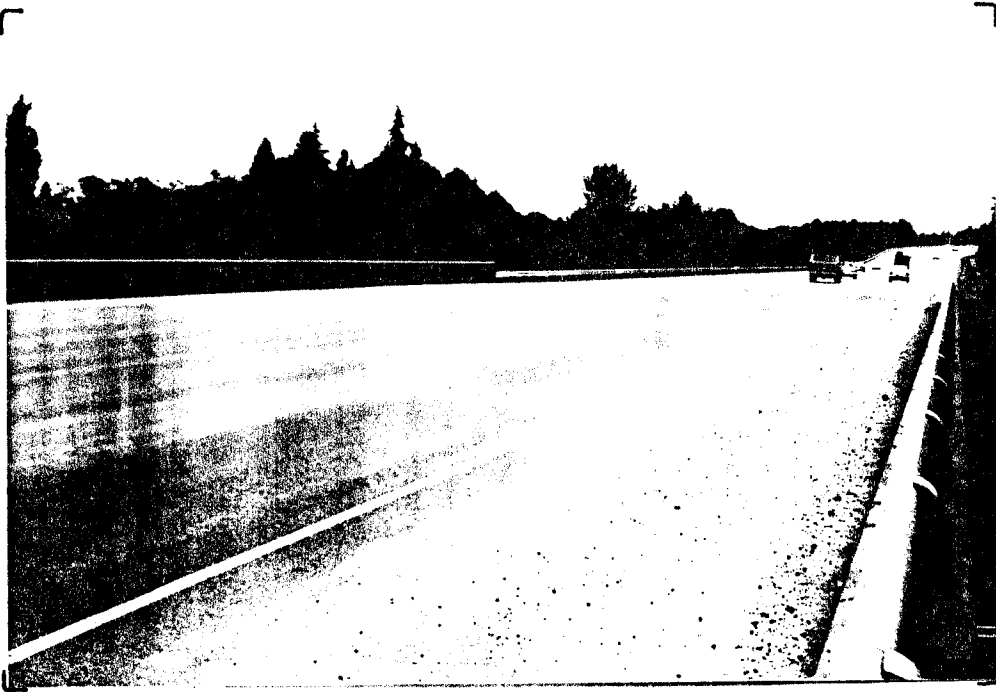
5/602 - Mid-span joint cut into overlay.



5/602 - West pavement seat.



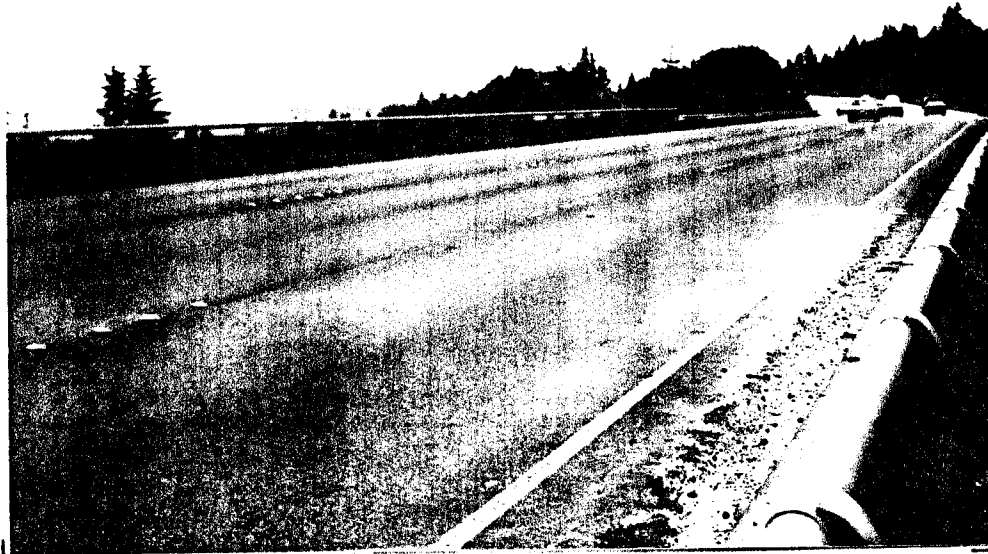
5/602 - East pavement seat.



5/626 W - Surface open and shows little or no wear. Heavy, high speed traffic Paved 1983. Rated 4



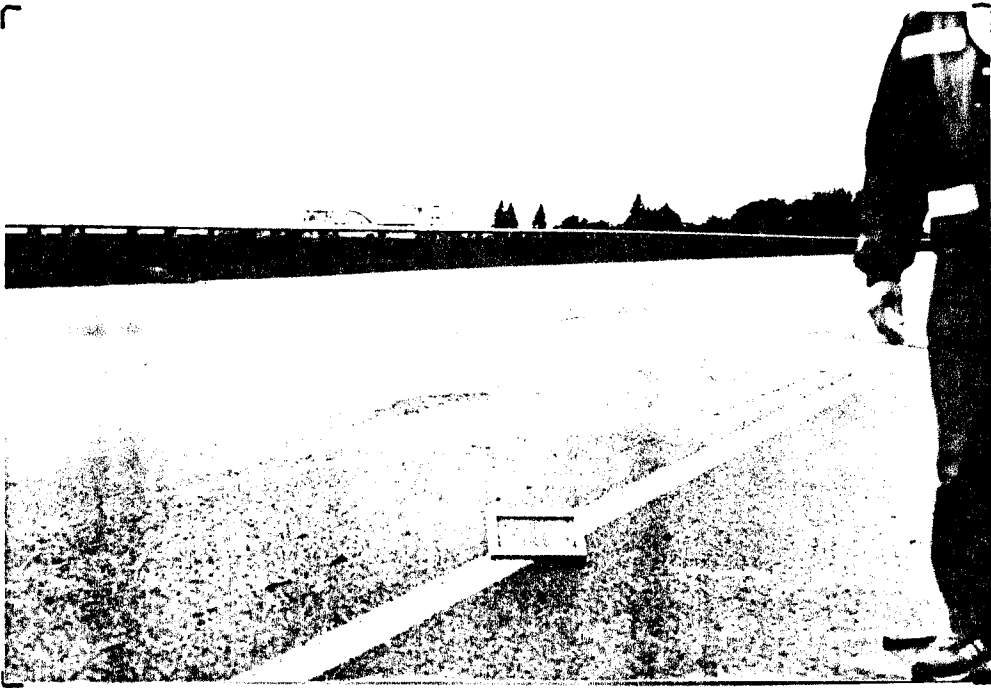
5/626 W - Some minor raveling at joints.



5/628 W - Surface open and shows little or no wear. Heavy, high speed traffic. Paved 1983. Rated 4



5/628 W - Some minor rutting at joints.



5/645 W - Surface shows some raveling,
rutting and flushing in various areas.
Heavy high speed traffic. Paved 1982.
Rated 9



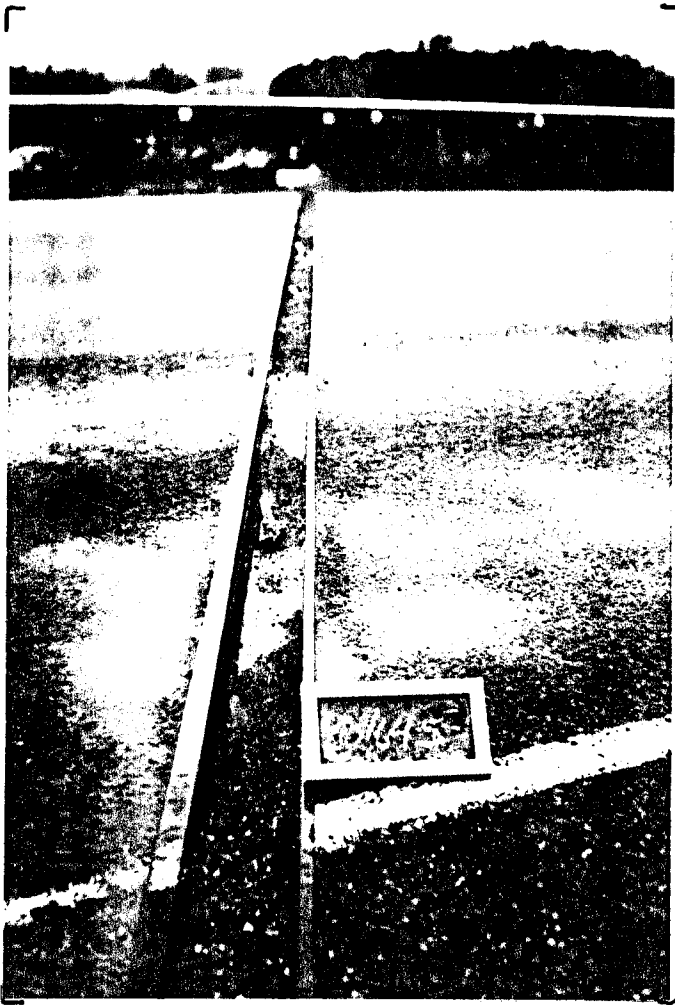
5/645 W - Rutting at joints.



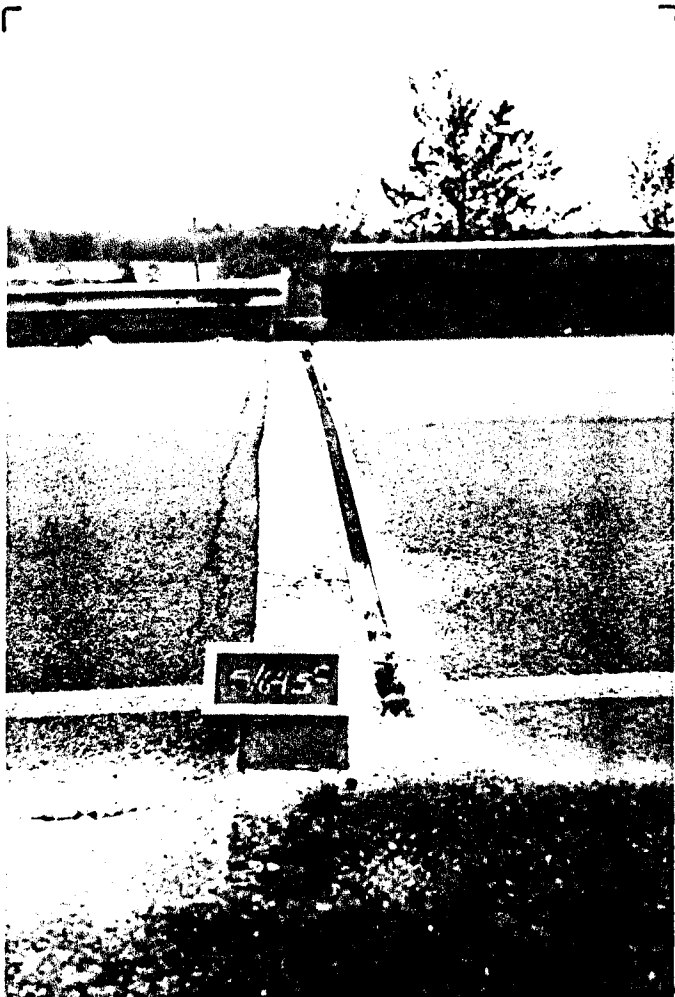
5/645 E - Surface shows some raveling,
rutting and flushing in various areas.
Heavy high speed traffic. Paved 1982.
Rated 9



5/645 E - Localized areas of
flushing.



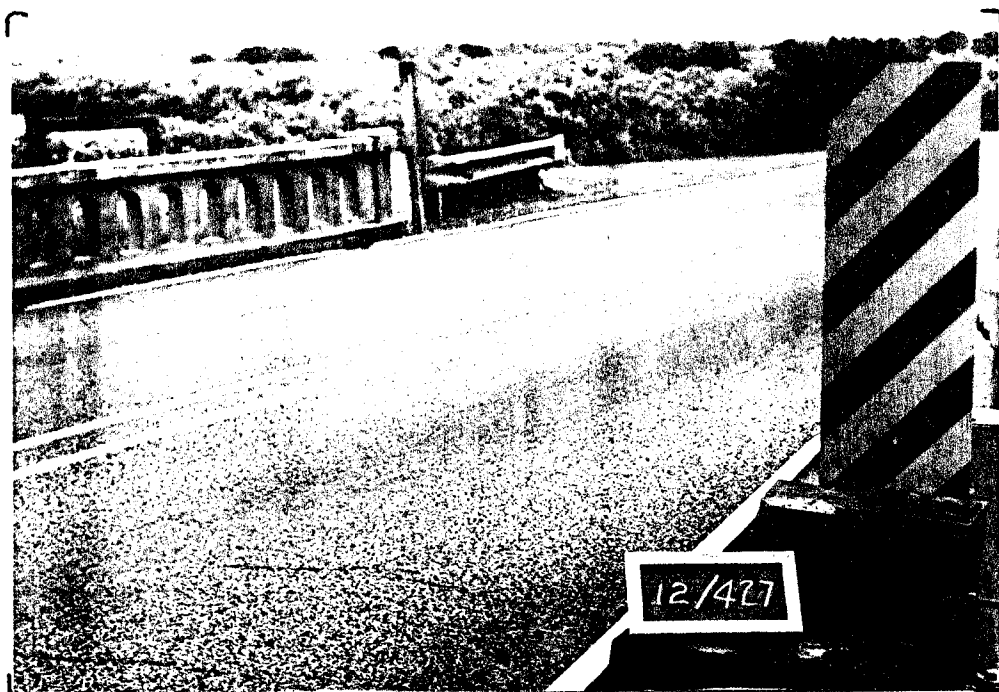
5/645 E - Rutting at joints



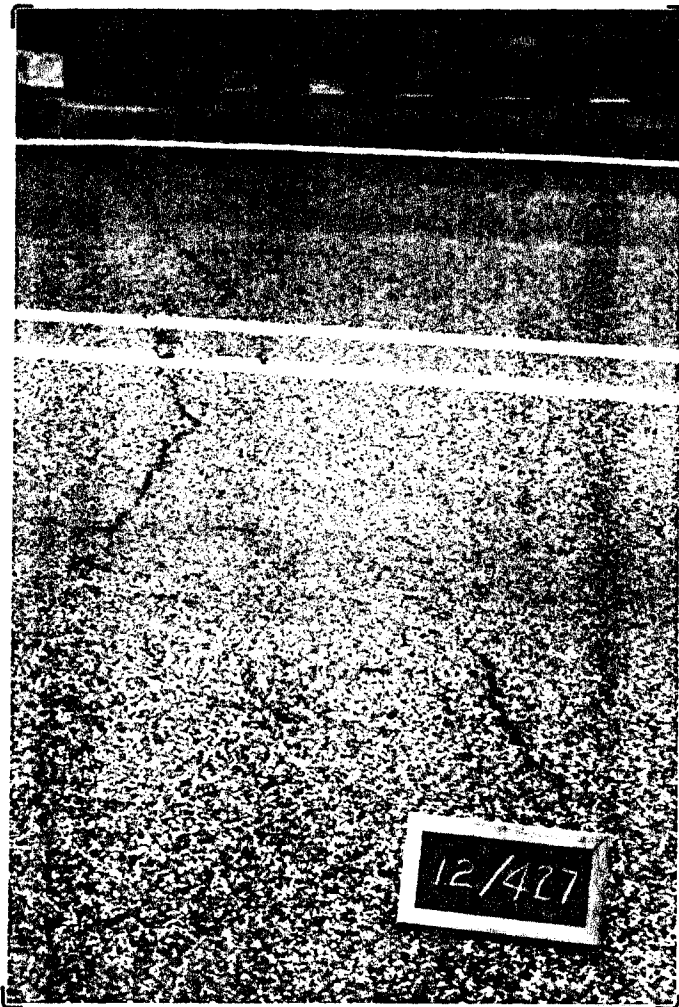
5/645 E - Pavement seat
joints breaking up.



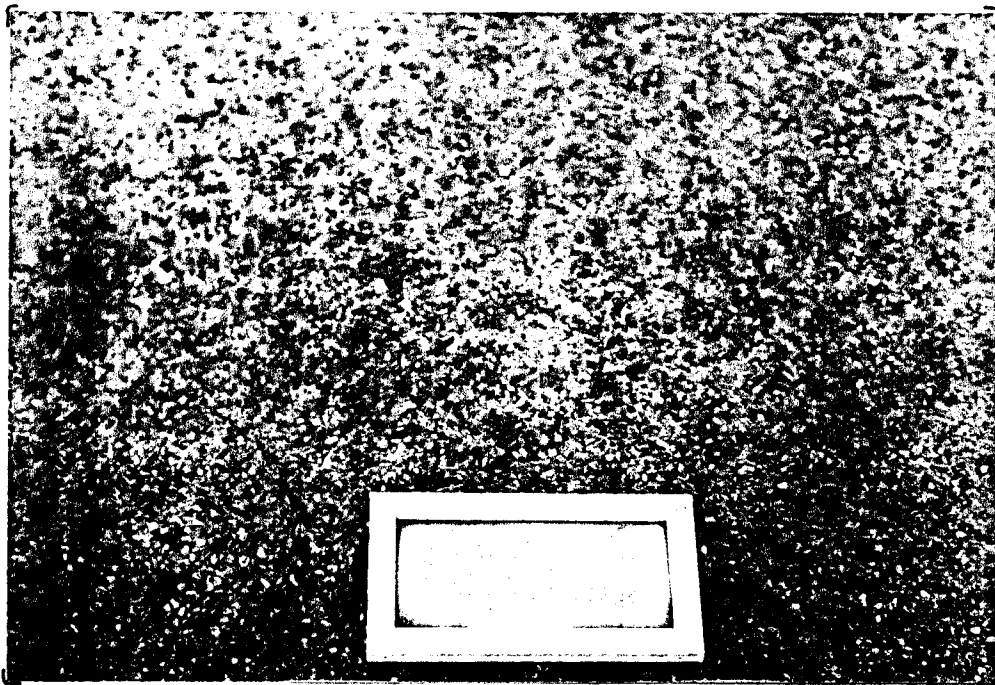
9/117 - Some raveling spots throughout. Moderate to heavy high speed traffic. Paved 1982. Rated 5



12/427 - Some studded tire wear. Moderate to heavy, high speed traffic. Paved 1982. Rated 4



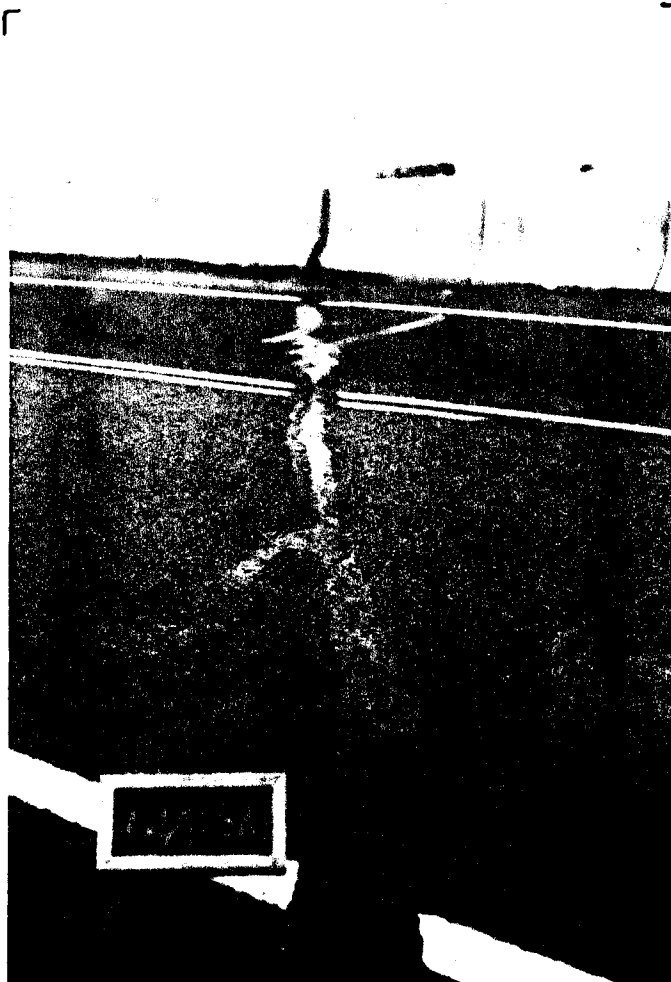
12/427 - Cracks at pavement seat.



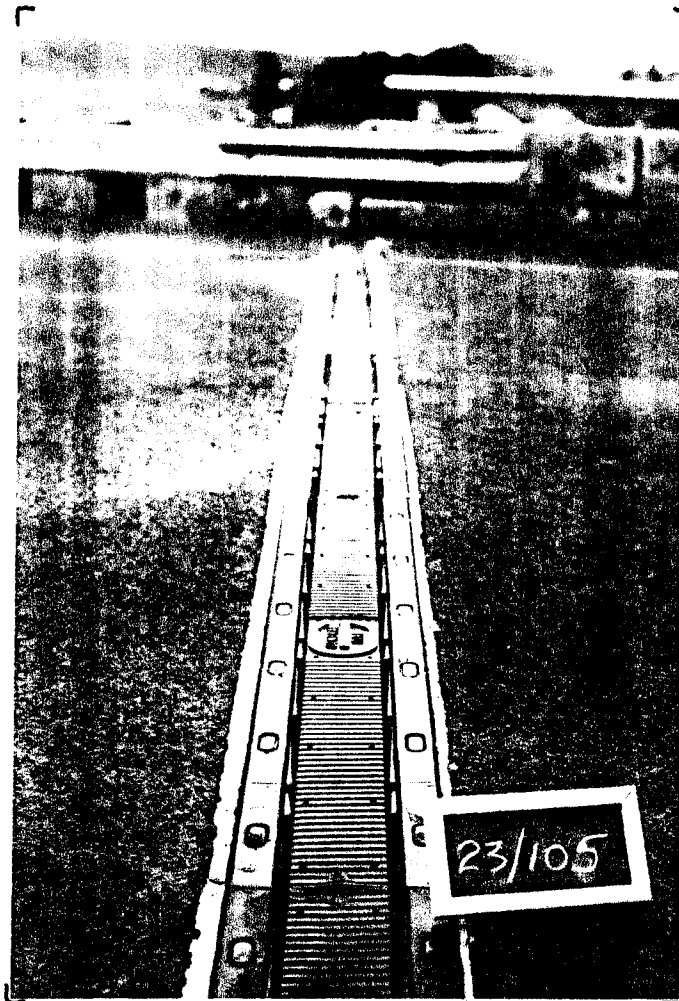
12/606 - Surface open and shows little or no wear. Moderate high speed traffic. Paved 1982. Rated 1



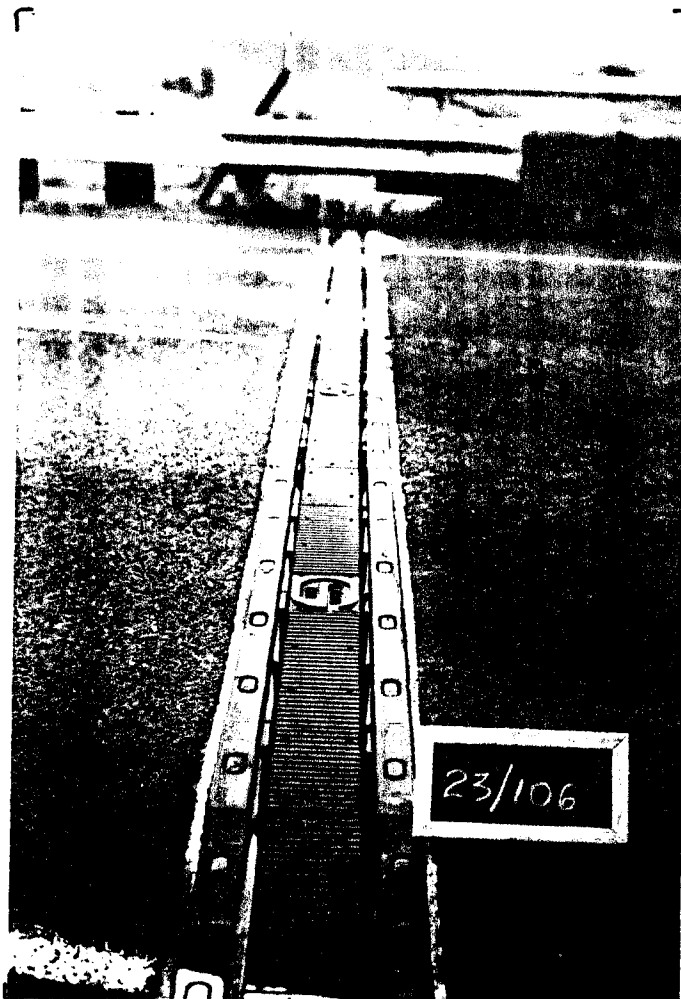
12/606 - Crack at pavement seat.



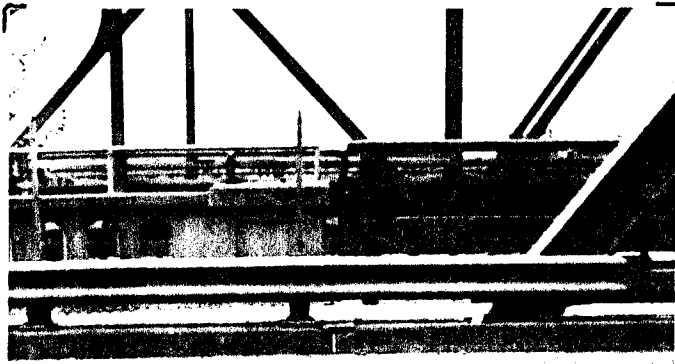
12/606 - Crack at pavement seat.



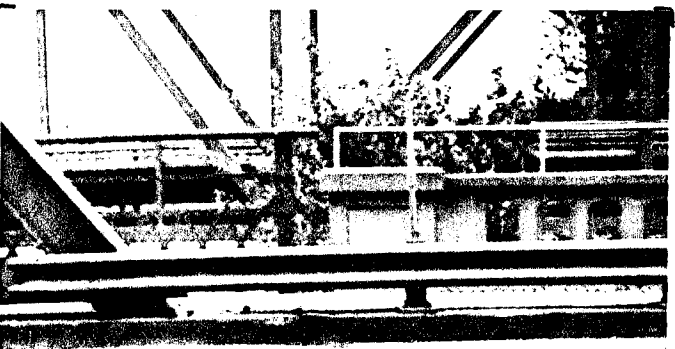
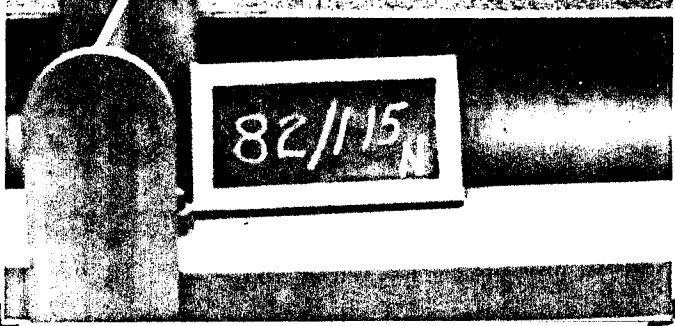
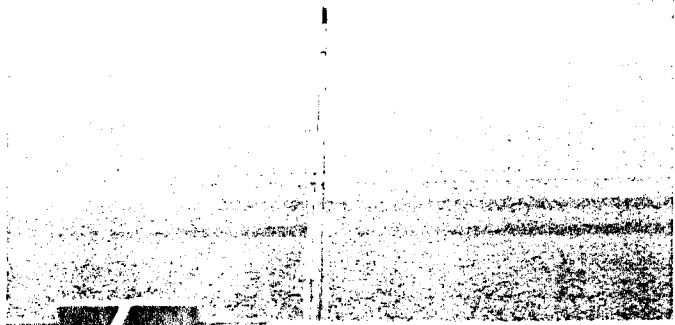
23/105 - Surface open and shows little or no wear. Light, slow speed traffic. Paved 1982. Rated 0



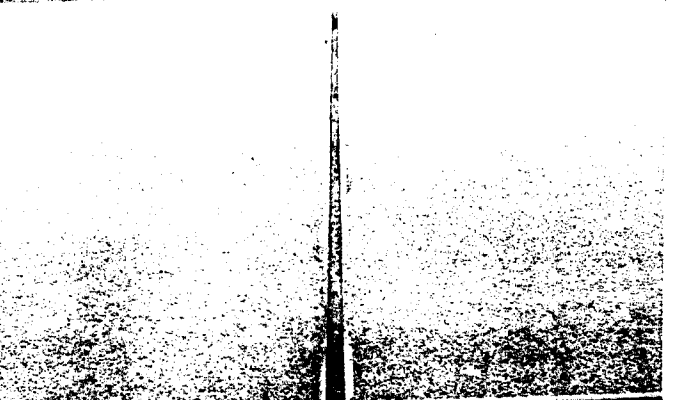
23/106 - Surface open and shows little or no wear. Light, slow speed traffic. Paved 1982. Rated 0

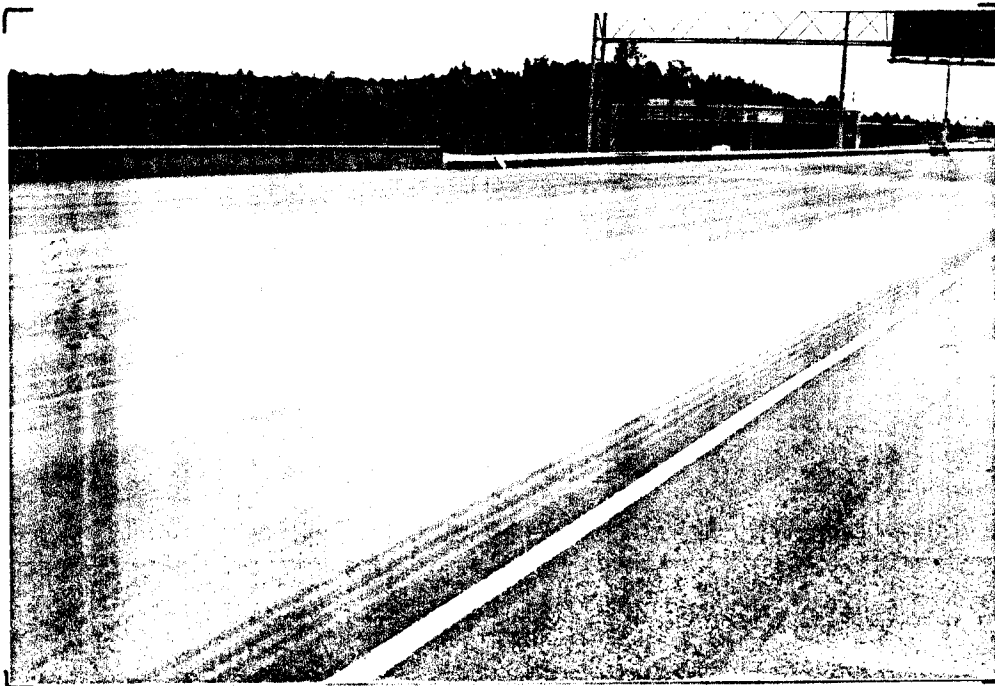


82/115 N - Surface open and shows little or no wear. Heavy, high speed traffic. Paved 1983. Rated 4

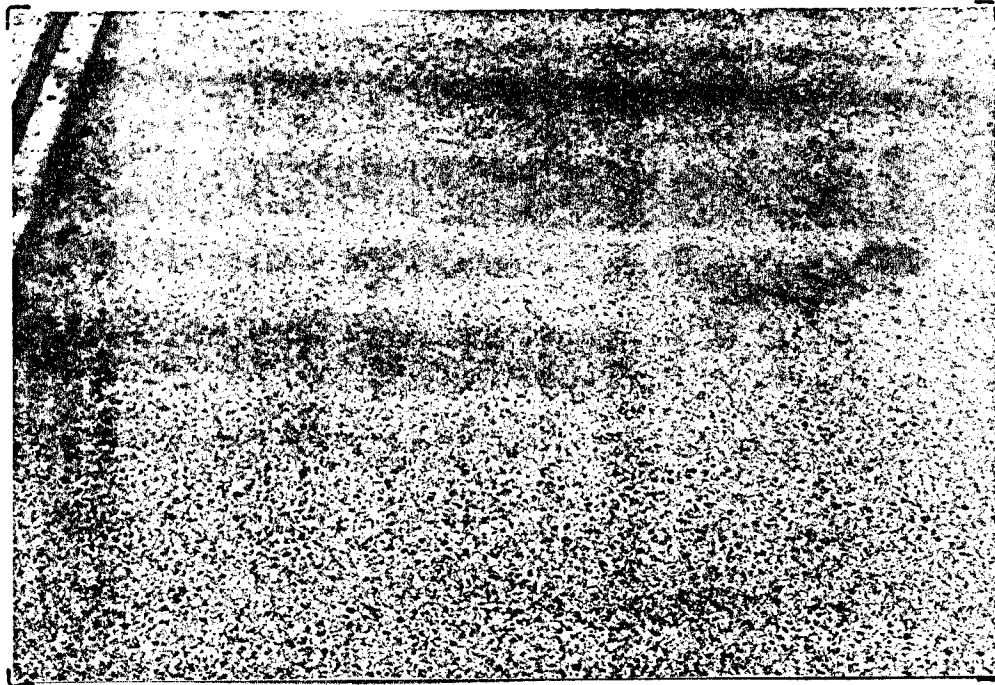


82/115 N - Some rutting at the joints.





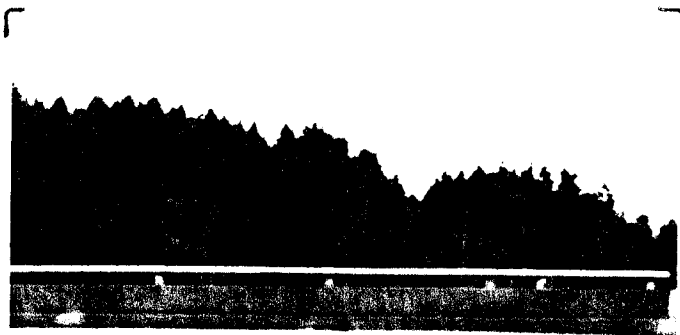
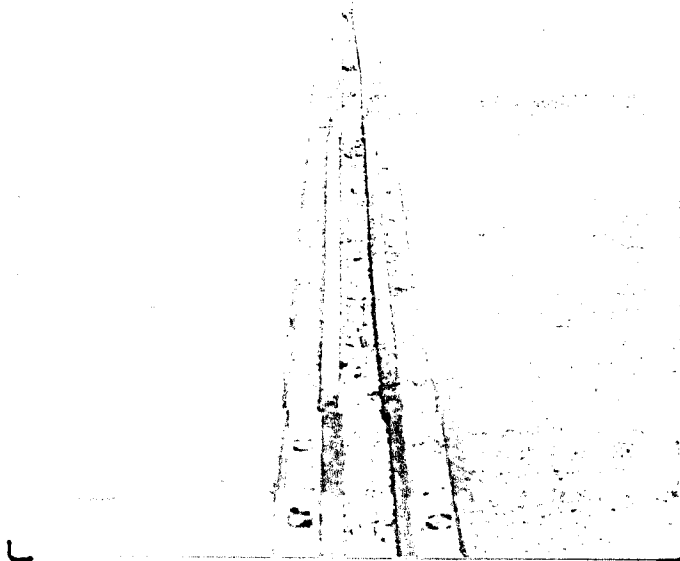
90/50 S- Surface has been sealed with asphalt and sand. Deck condition identical to adjoining roadway. Paved 1983. Sealed ? Rated 0



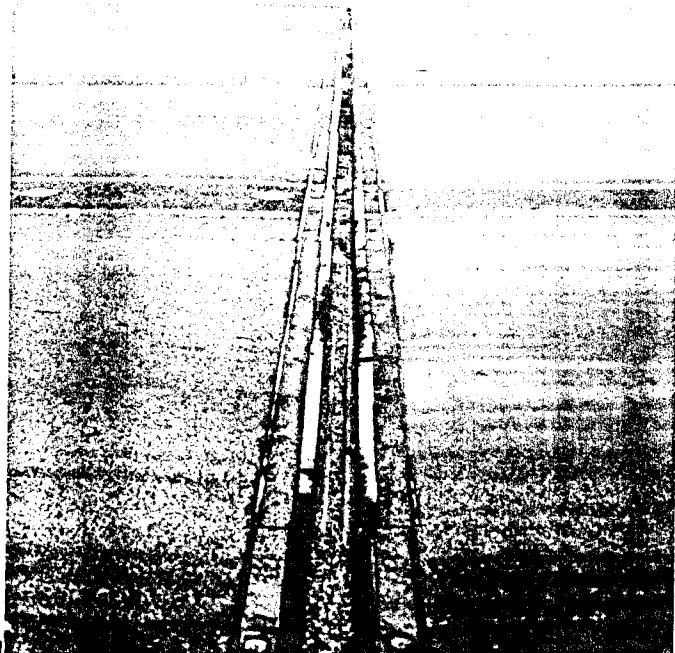
90/50 S- Striations produced by surface seal.

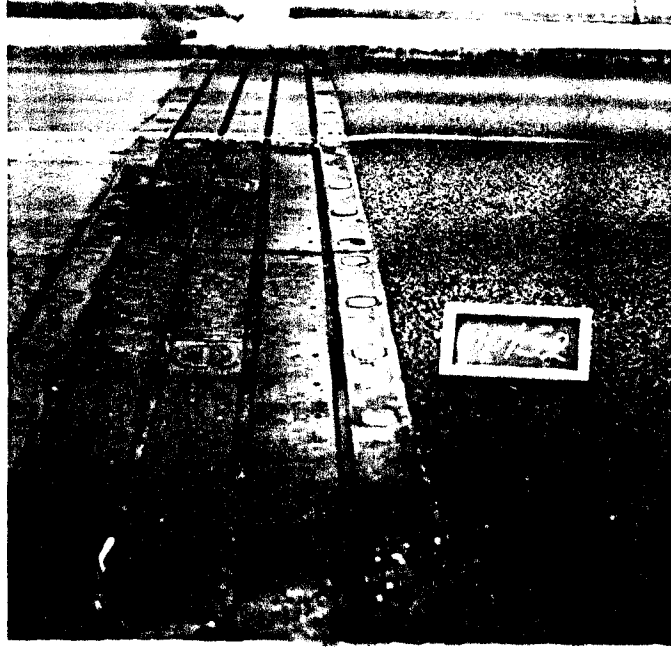
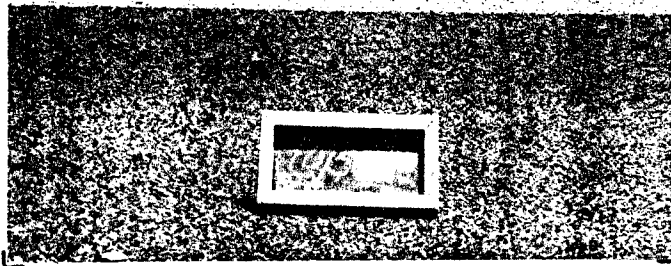
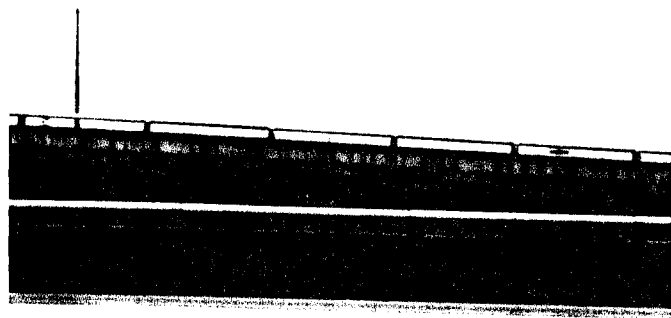


90/50 S - West pavement seat.



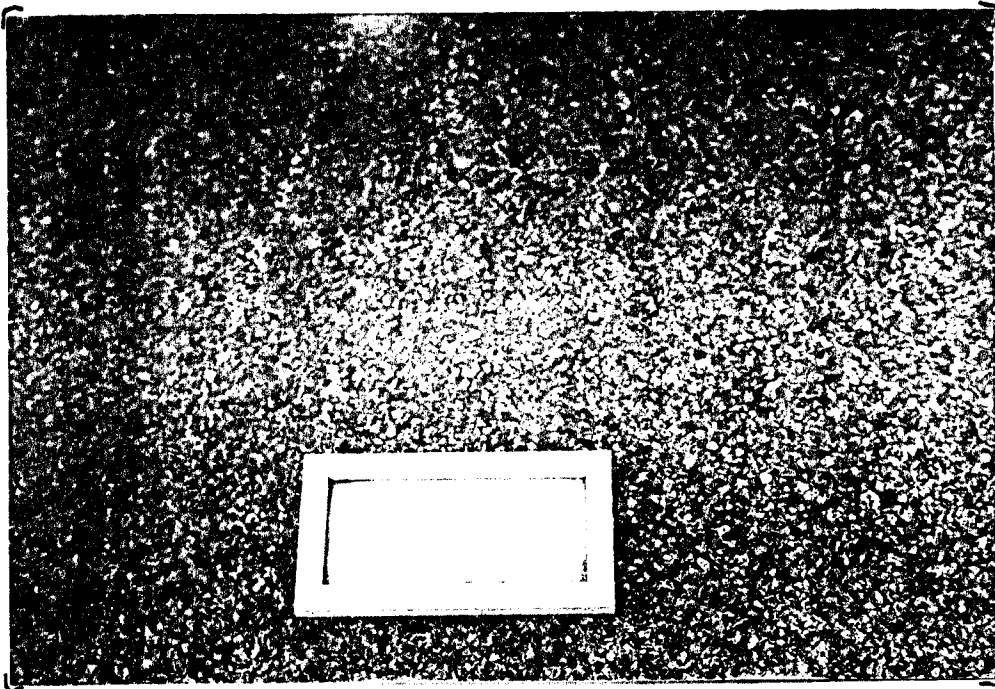
90/50 S - East pavement seat.



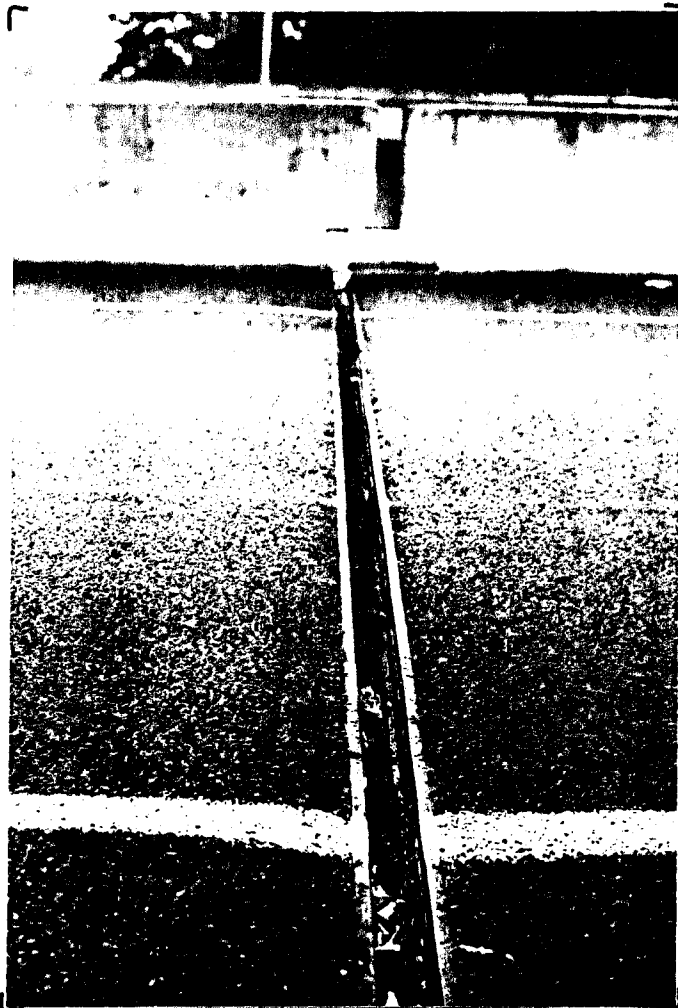


90/50 N - Surface open and shows little or no wear. Heavy high speed traffic. Paved 1983. Rated 0

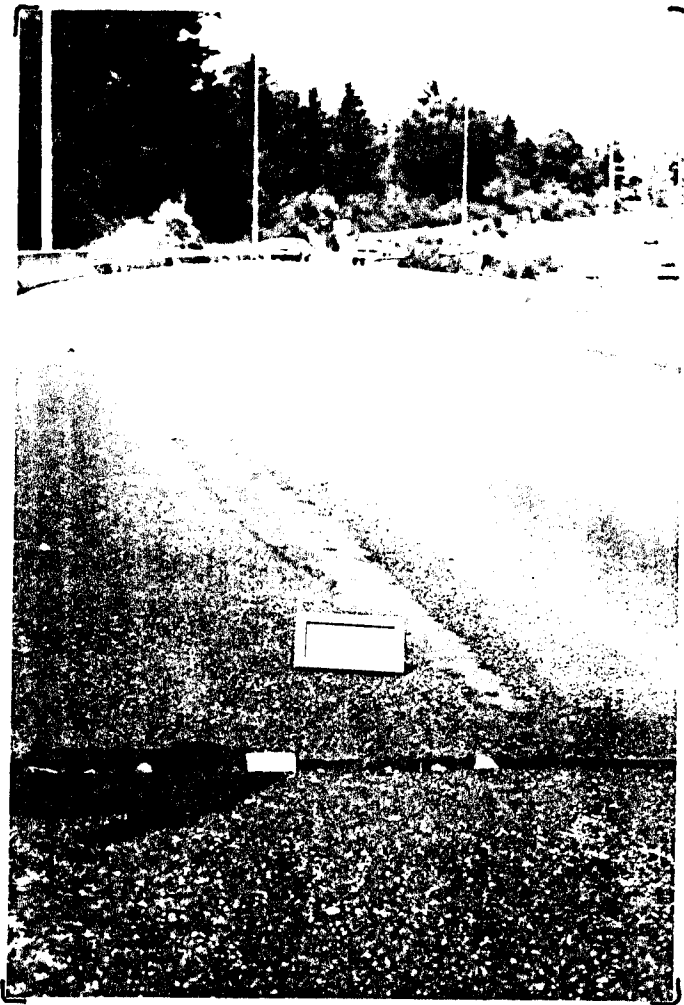
90/52 - Surface open and shows no wear. Very light, slow speed traffic. Paved 1983. Rated 0



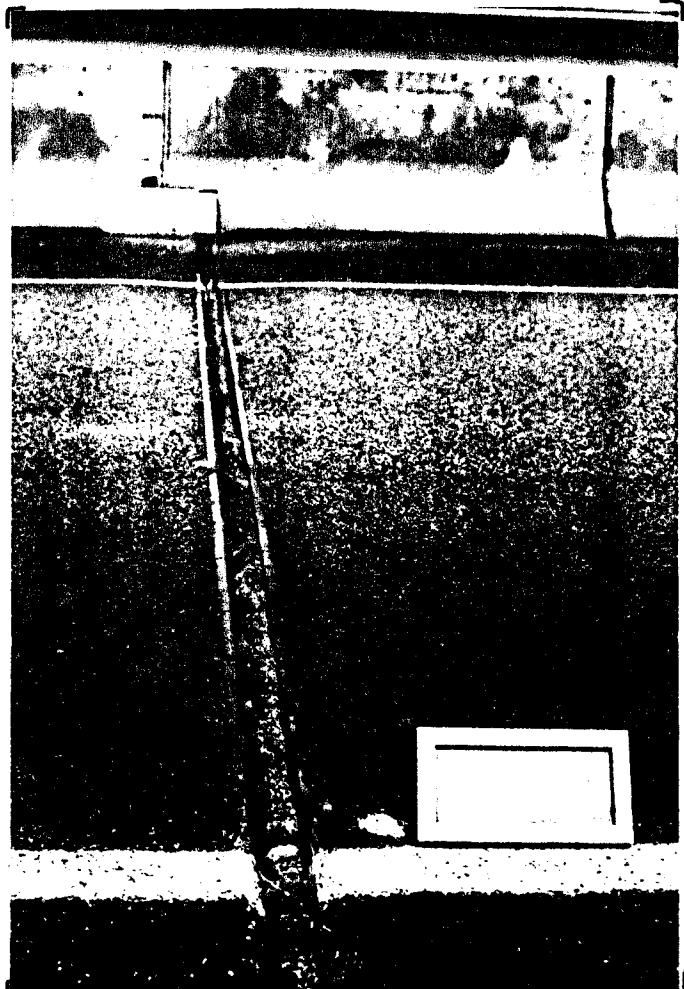
90/52 - Coarser surface texture than observed on other bridge decks.



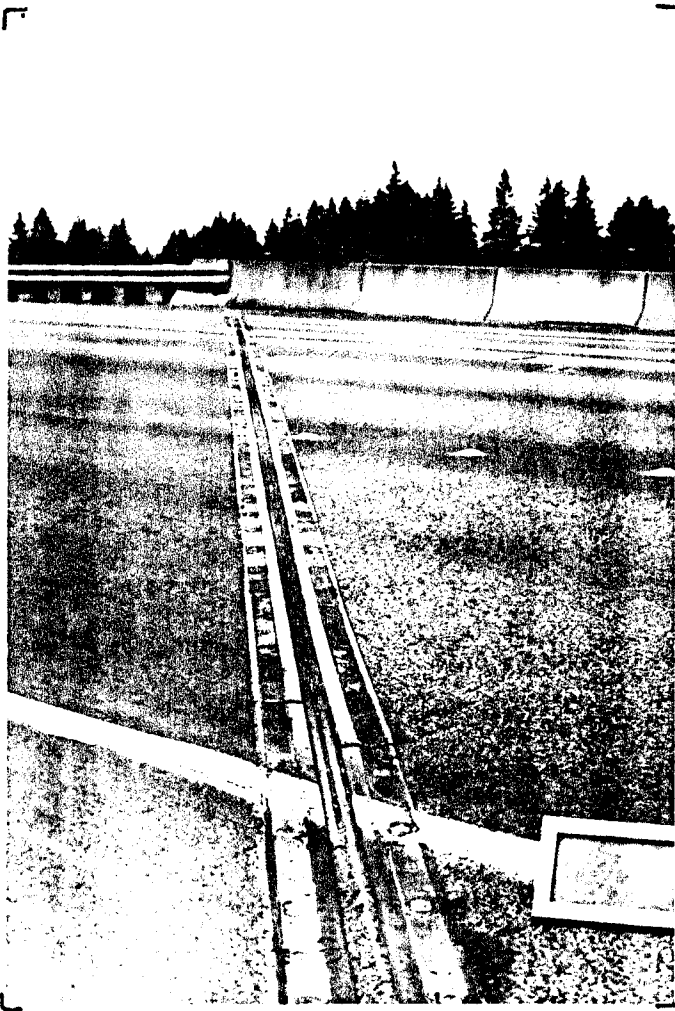
90/52 - Typical joint.



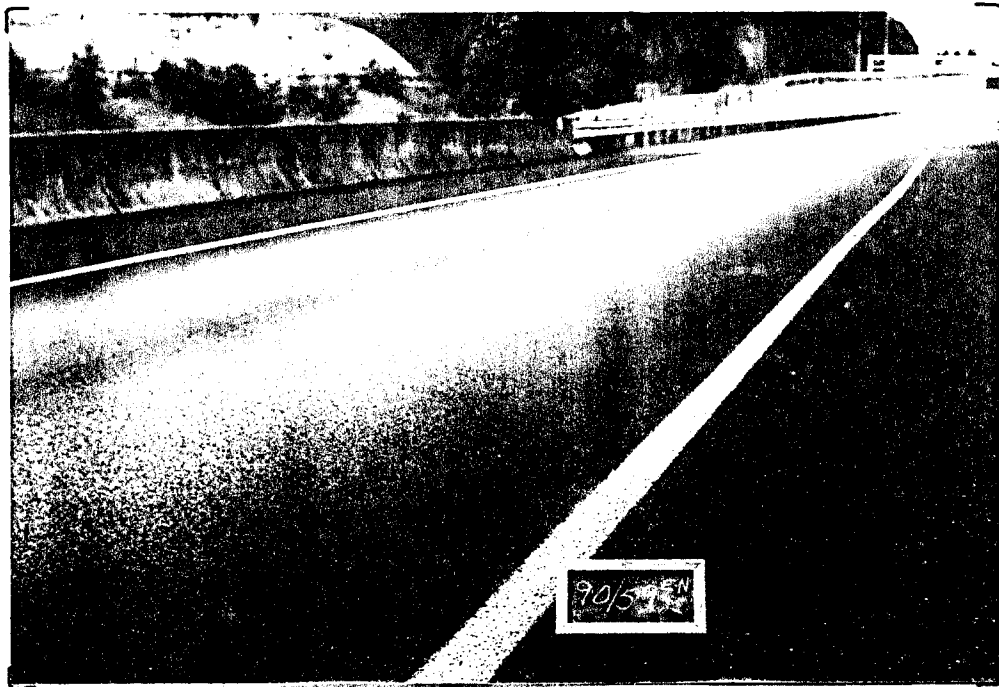
90/54 S-W - Surface open and shows little or no wear. Moderate, slow speed traffic. Paved 1983. Rated 0.



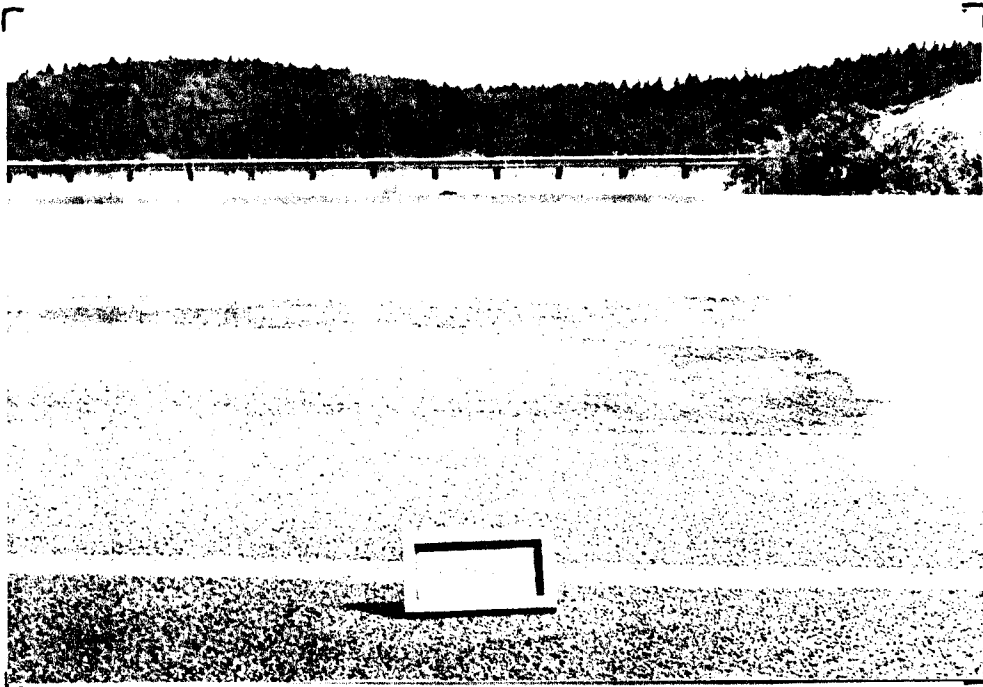
90/54 S-W - Typical joint.



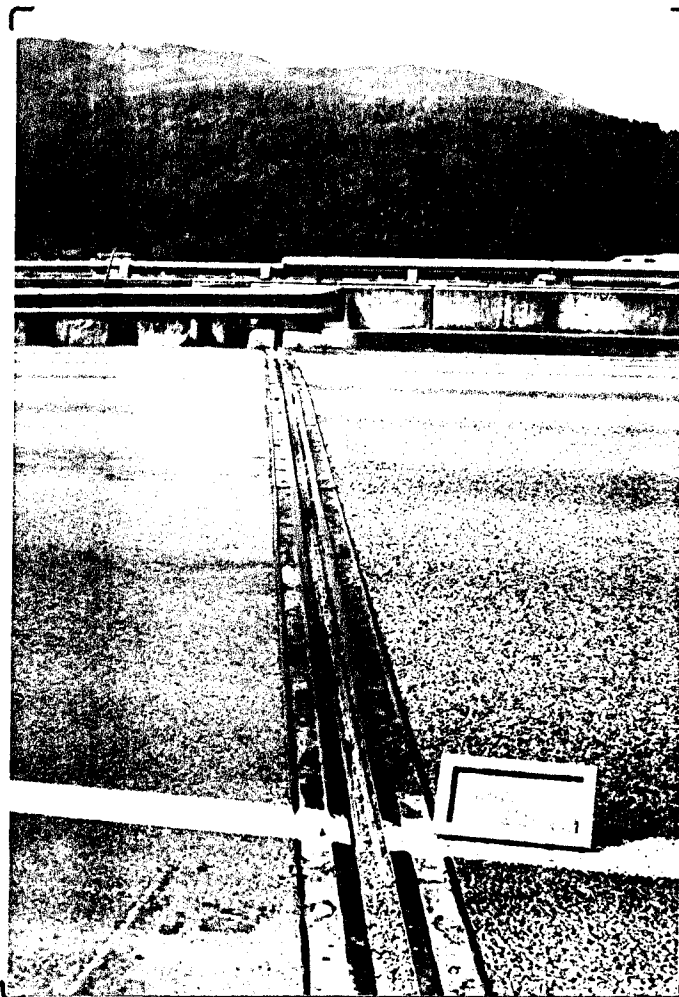
90/59 S - Surface open and shows little wear. Comparing to adjacent ramp structure (next photo) paved under same contract is somewhat deceiving. Paved 1983. Moderate high speed traffic. Rated 0



90/59 E-N - Surface open and shows no wear. Moderate, decelerating traffic. Paved 1983. Rated 0.



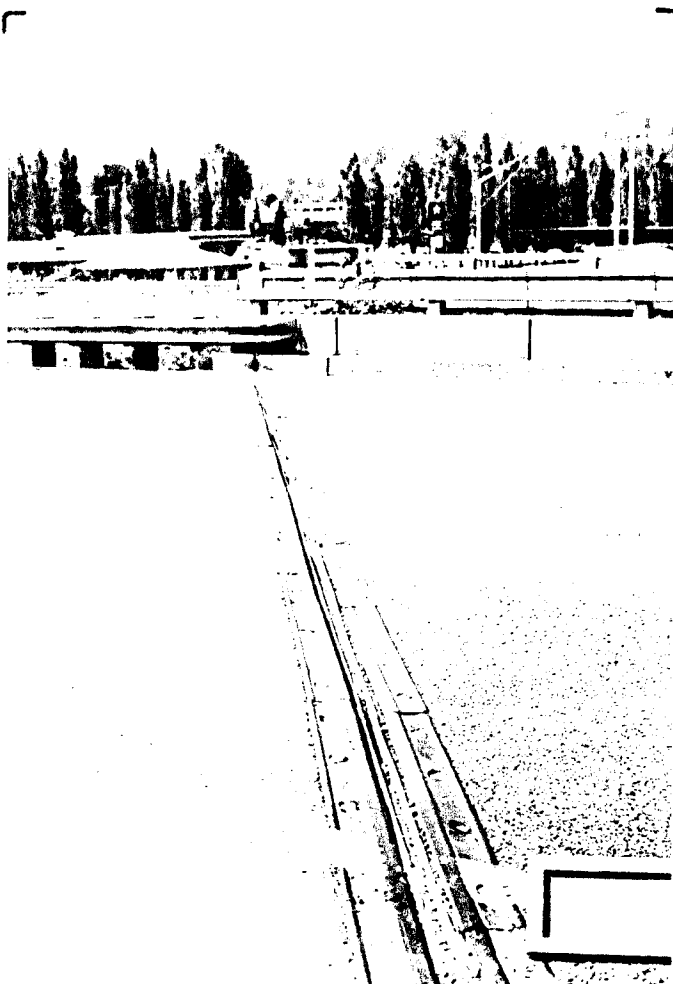
90/63 S - Some flushing and raveling at east end.
Moderate high speed traffic. Paved 1983.
Rated 5



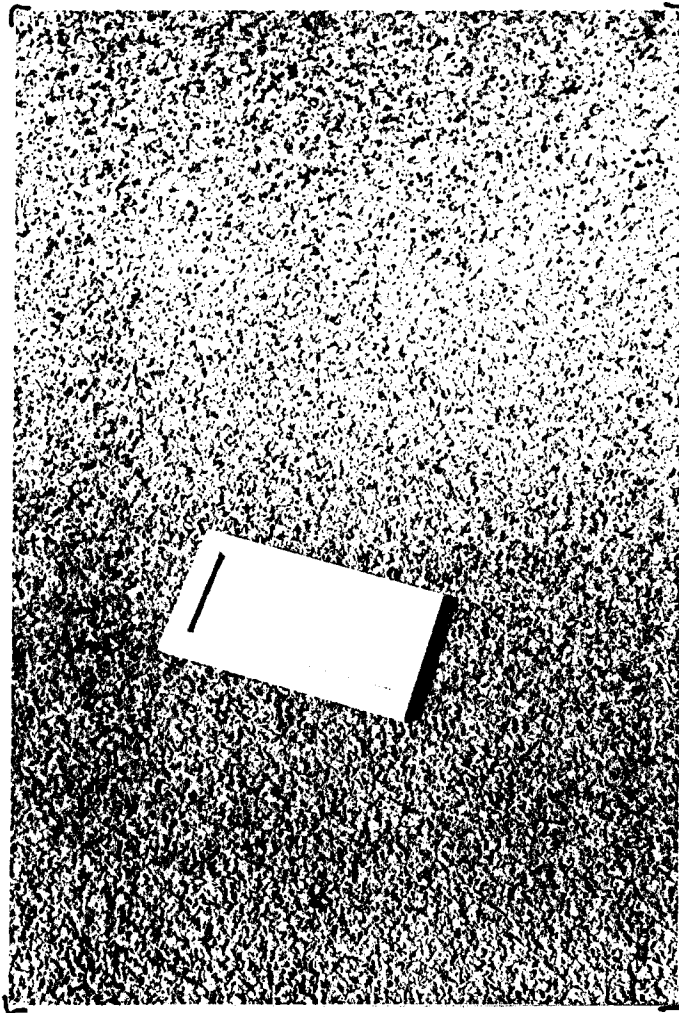
90/65 N - Surface open and
shows little or no wear.
Some diving at the joints.
Paved 1983. Rated 0



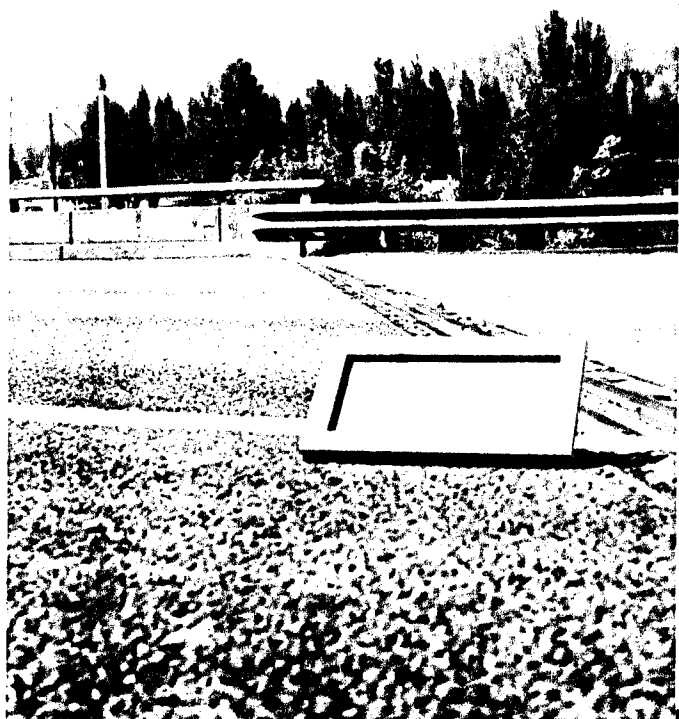
90/65 W-W - Surface generally open but has one large flushing area in wheel path. Structure is subjected to concrete ready-mix truck traffic. Paved 1983. Rated 0



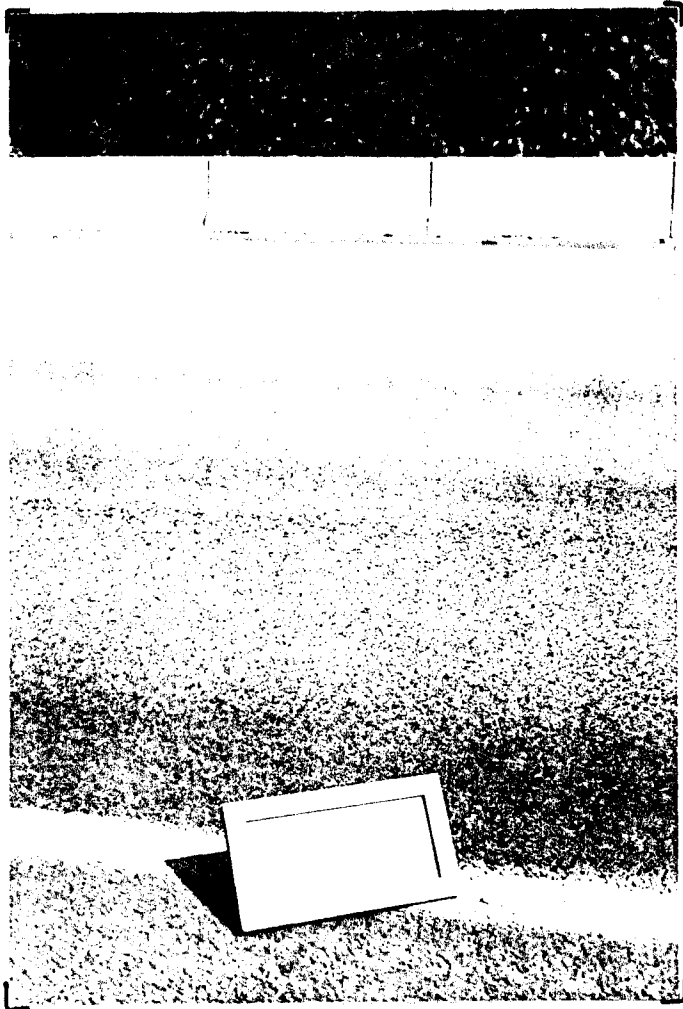
90/66 N - Surface open and shows little or no wear. Some diving at the joints. Moderate high speed traffic. Paved 1983. Rated 0



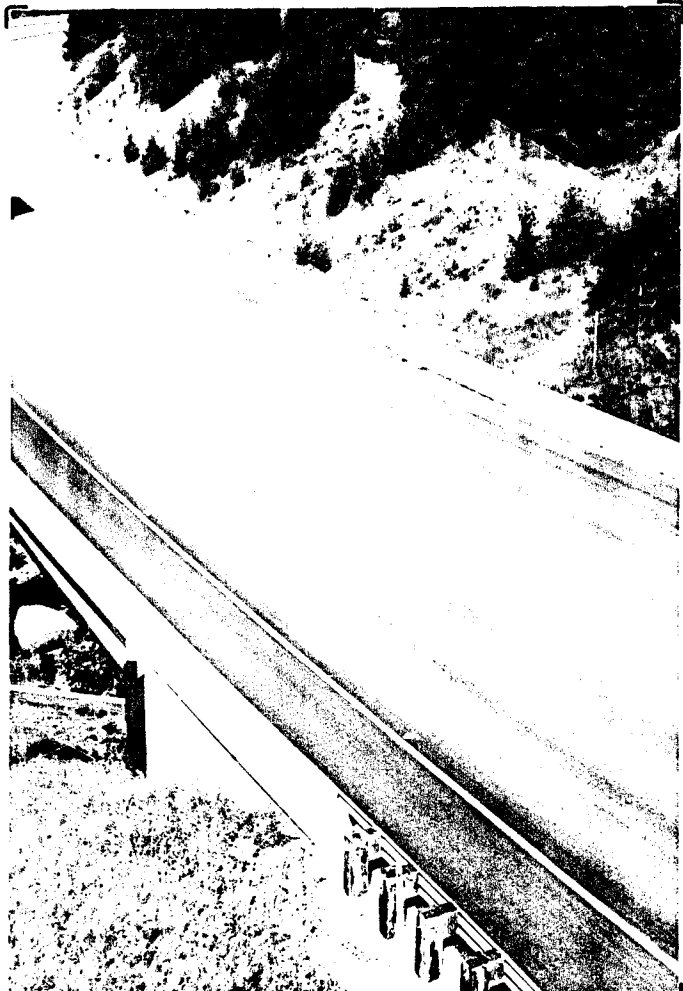
90/66 S - Surface open and shows little or no wear. Moderate, high speed traffic. Paved 1983. Rated 0



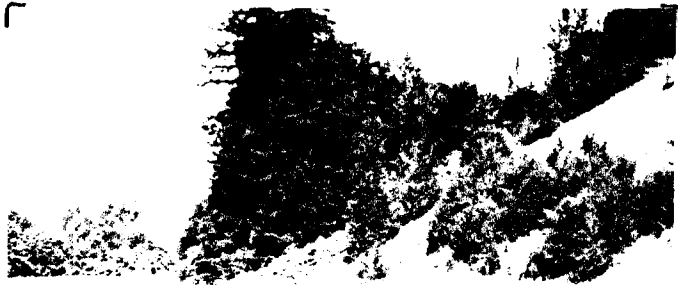
90/66 S - Some diving at the joints.



90/68 N - Surface open. Some
rutting and studded tire wear.
Moderate, high speed traffic.
Paved 1983. Rated 4



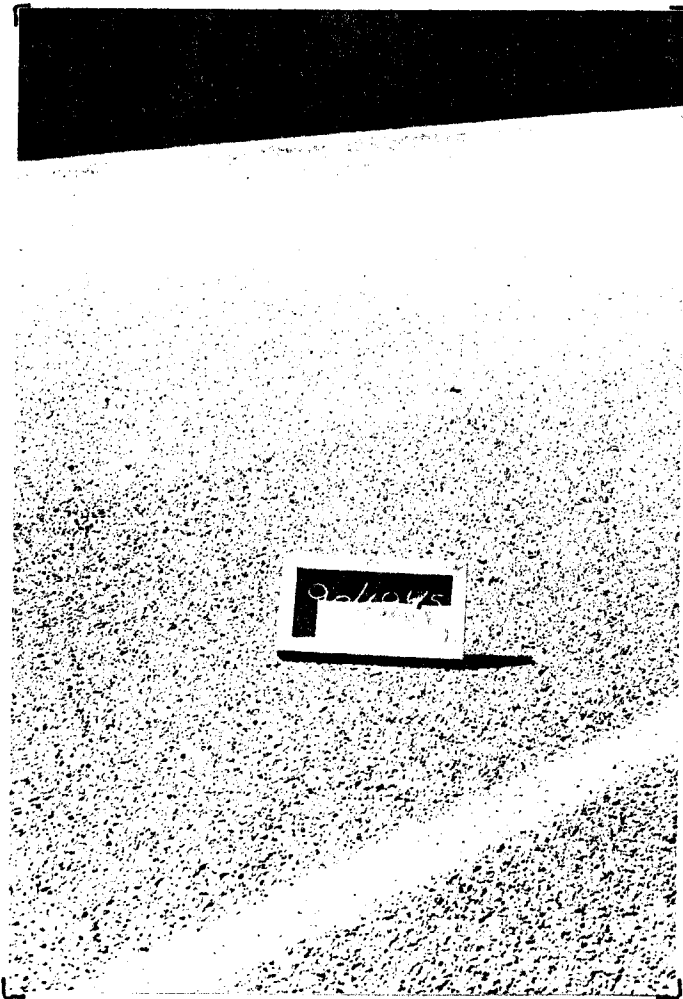
90/68 N - Looking west.



90/68 S - Surface open. Some rutting and studded tire wear. Moderate, high-speed traffic. Paved 1983. Rated 4.



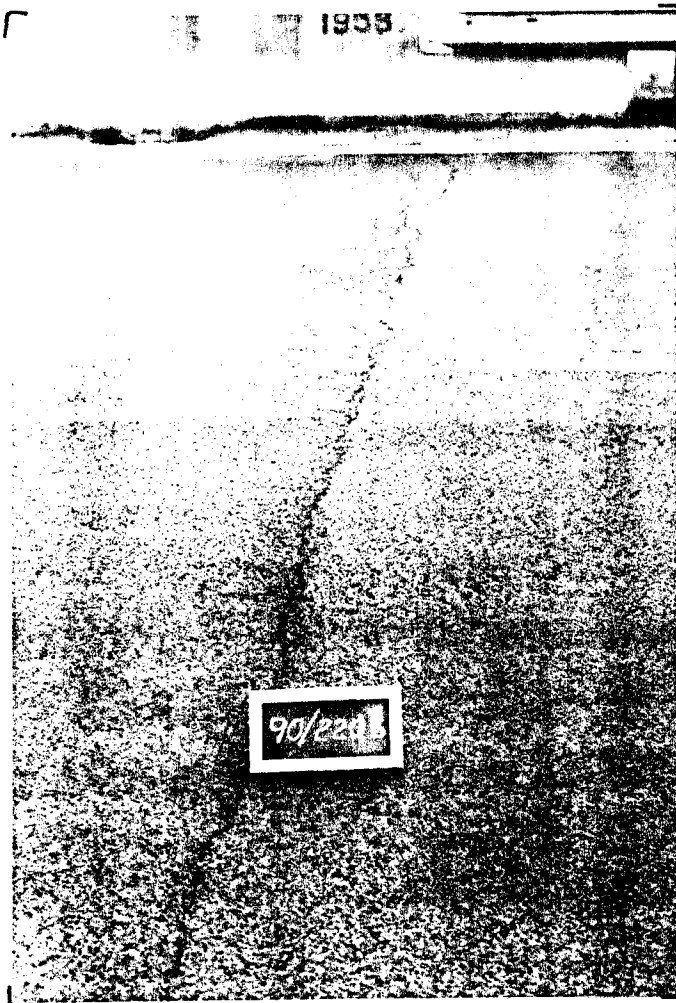
90/68 S - Looking west.



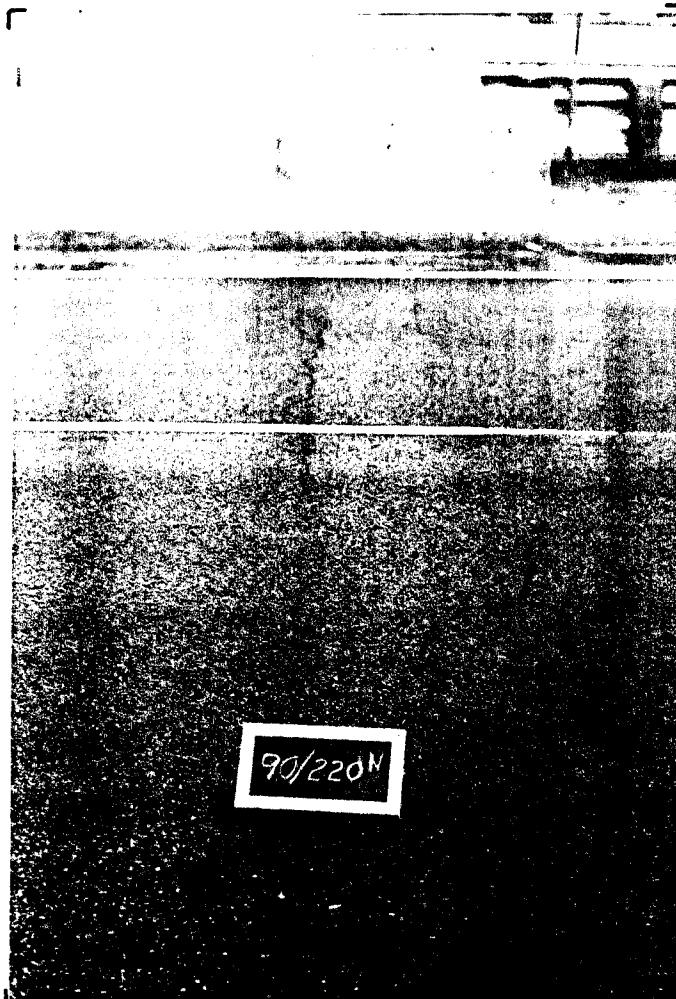
90/69 W-S - Surface open and shows little wear. Moderate medium speed traffic. Paved 1983. Rated 4



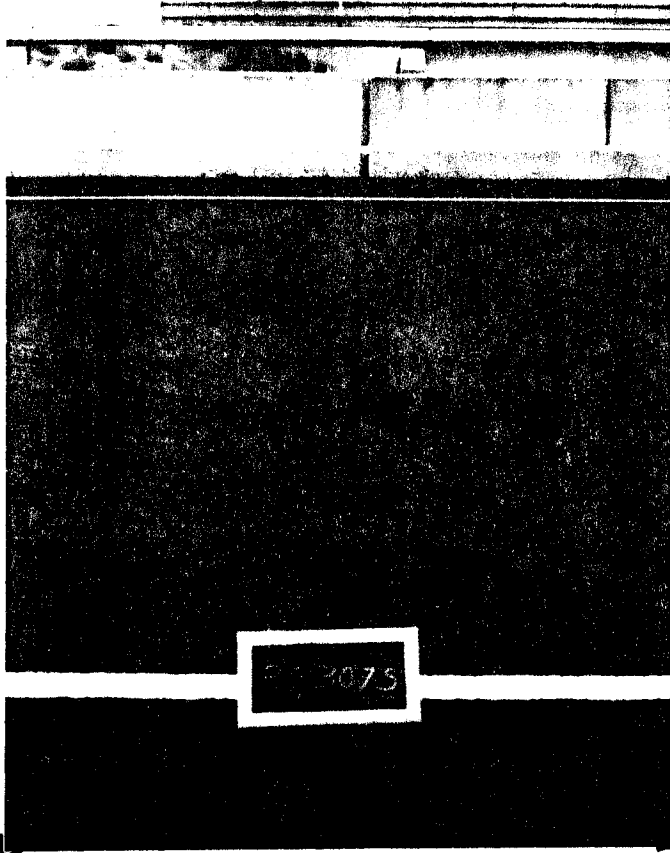
90/69 W-S - Some minor localized raveling.



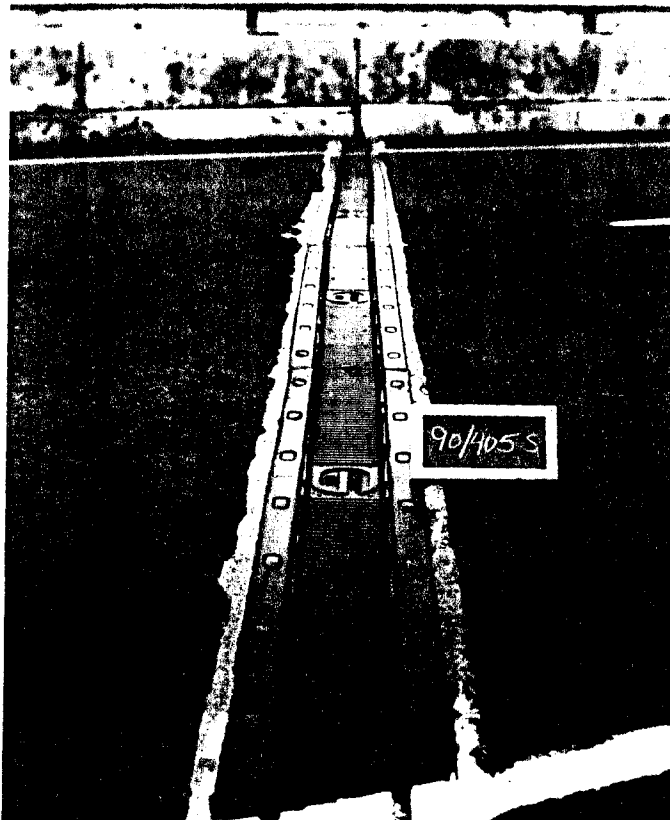
90/220 S - Surface open and shows little or no wear. Cracks at pavement seats. Moderate high speed traffic. Paved 1983. Rated I



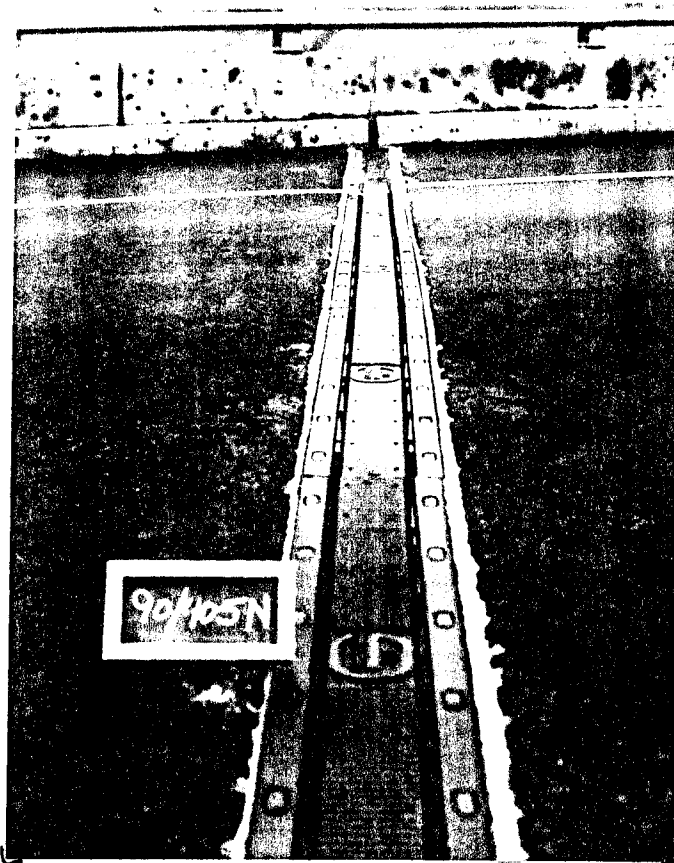
90/220 N - Surface open and shows little or no wear. Cracks at pavement seats. Moderate high speed traffic. Paved 1983. Rated I.



90/307 S - Surface open and shows little or no wear. Moderate high speed traffic. Cracks at pavement seats. Paved 1982. Rated 1.



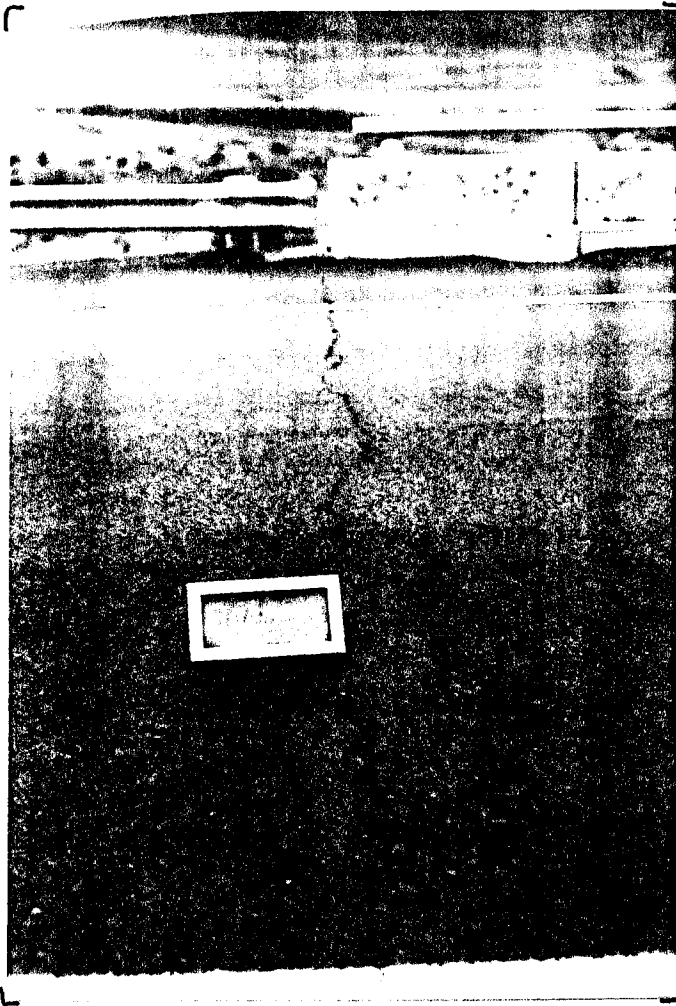
90/405 S - Surface open and shows little wear. Minor rutting at expansion joints. Moderate, high speed traffic. Paved 1982. Rated 4.



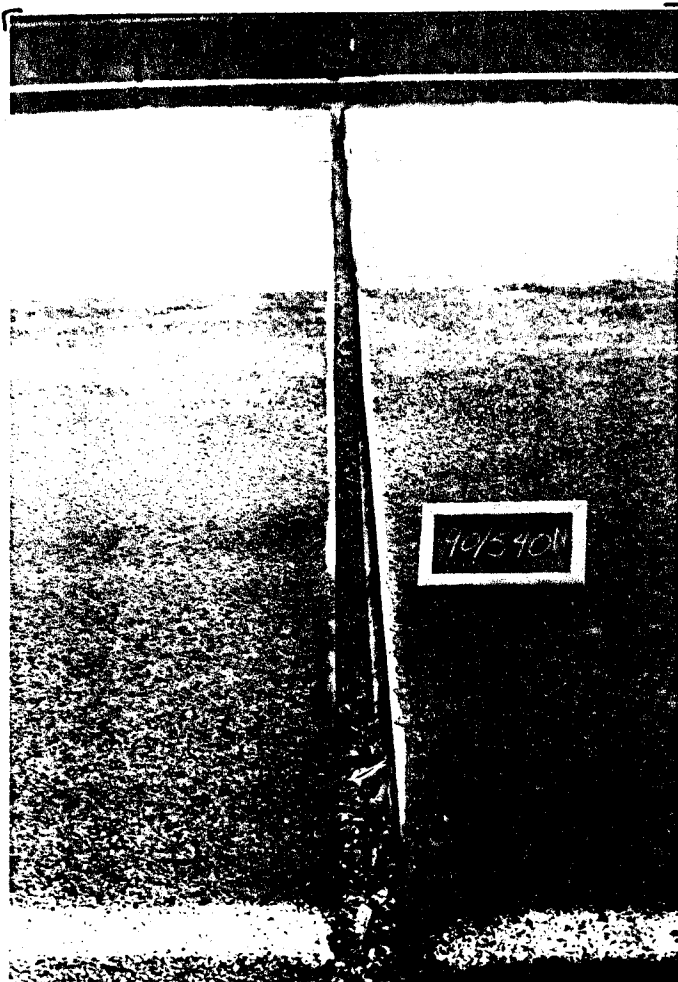
90/405 N - Surface open and shows little wear. Minor rutting at expansion joints. Moderate, high speed traffic. Paved 1982. Rated 4.



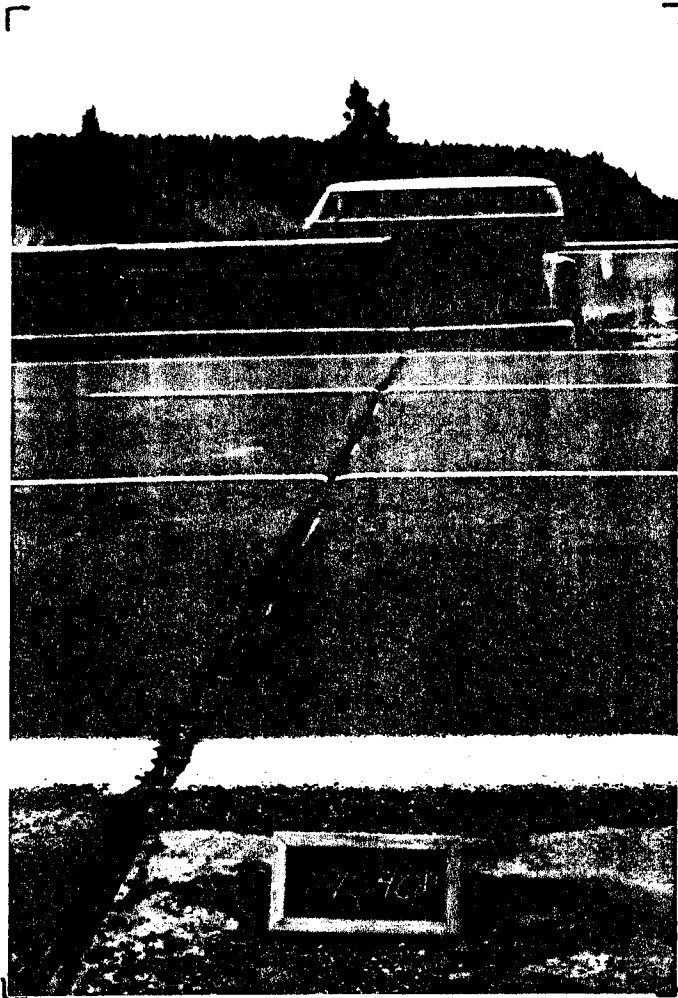
90/408 S - Surface open and shows little or no wear. Crack at downstream pavement seat. Moderate high speed traffic. Paved 1982. Rated 1.



90/408 N - Surface open and sho
little or no wear. Crack at
downstream pavement seat.
Moderate high speed traffic.
Paved 1982. Rated I.



90/540 N - Surface showing
acute distress. Raveling and
rutting at joints.



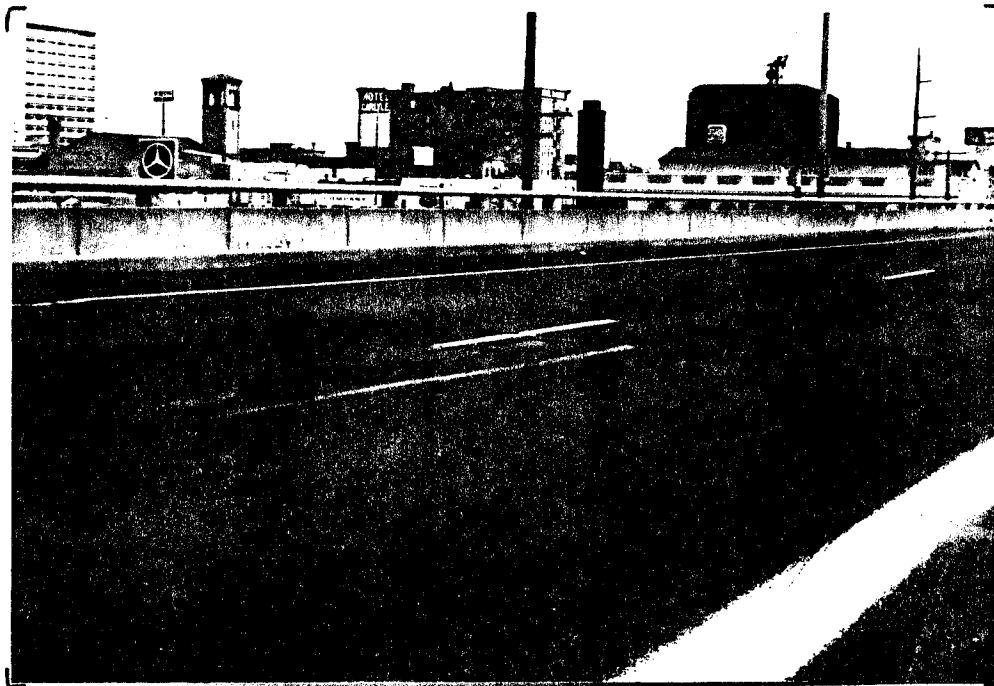
90/540 N - Rutting and raveling at pavement seat.



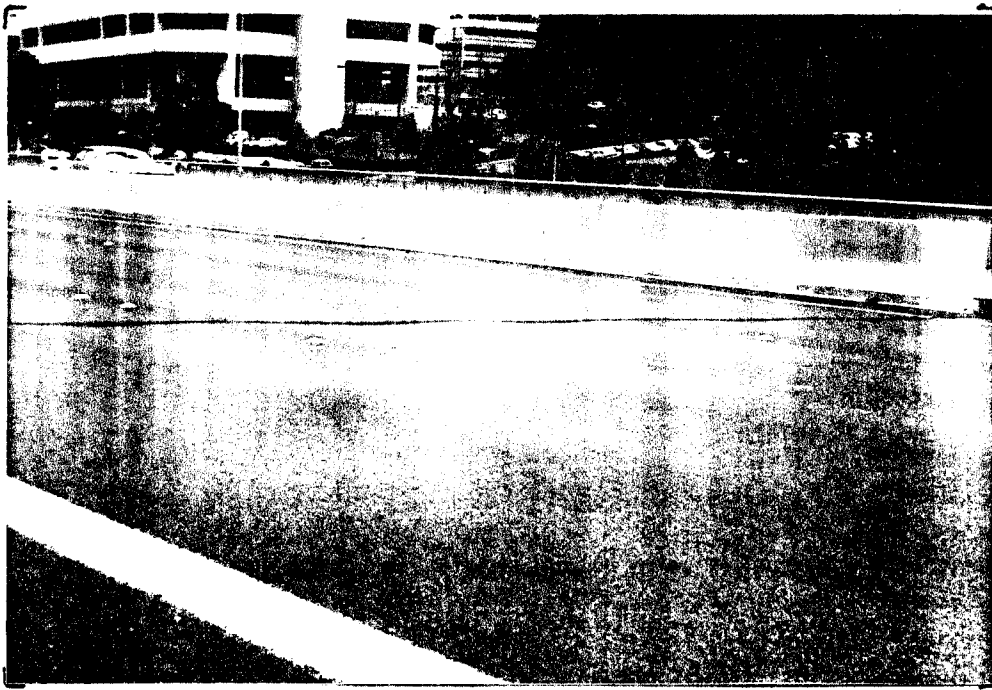
90/540 N - Patching not holding up either.



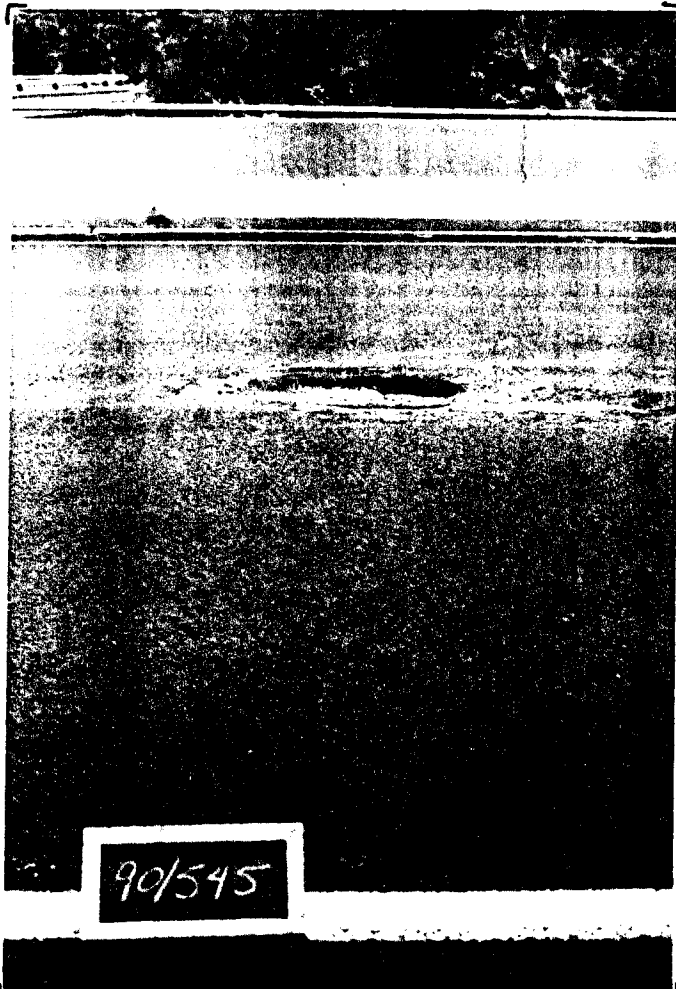
90/540 N - Potholes prevalent throughout. Heavy, high speed traffic. Paved 1983. Rated 21.



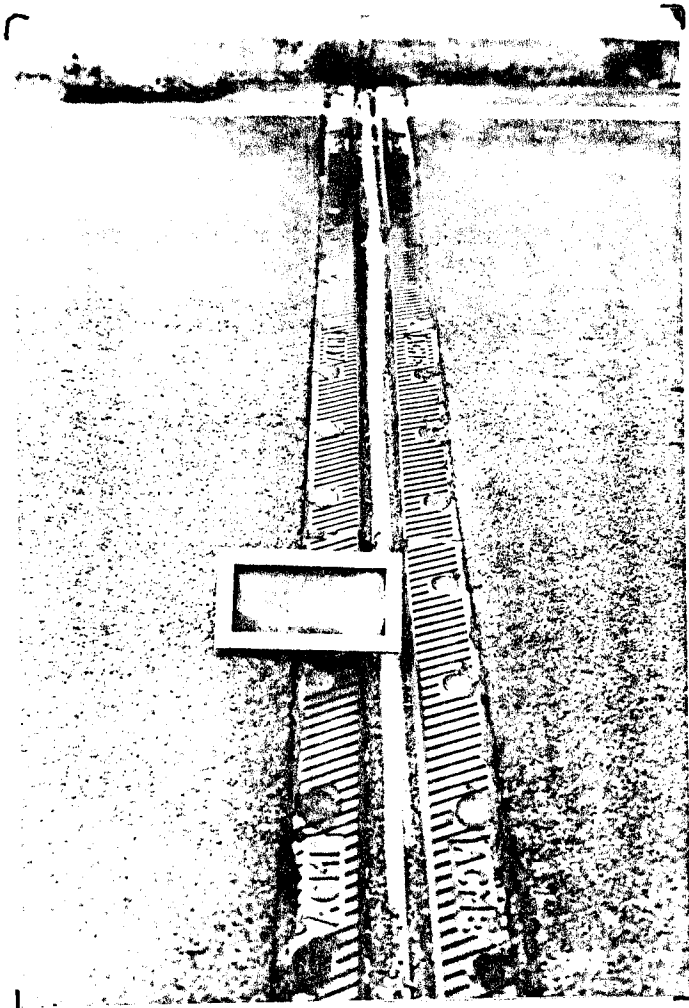
90/545 - Severe rutting and raveling (down to concrete) in eastbound lanes. Not quite as bad in westbound lanes. (Shown)



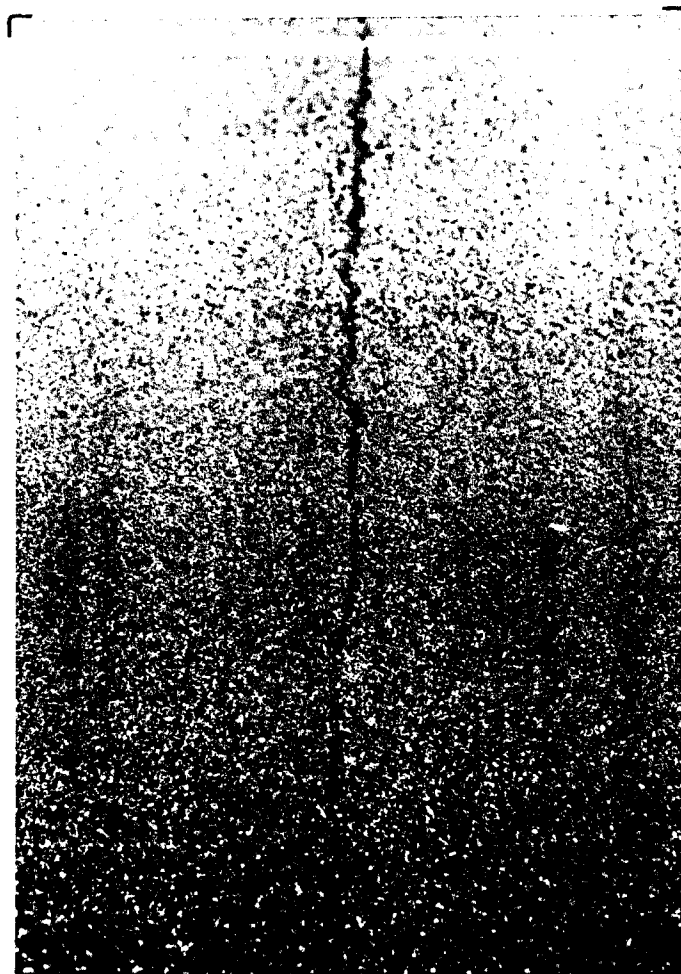
90/545 - Rutting at joints.



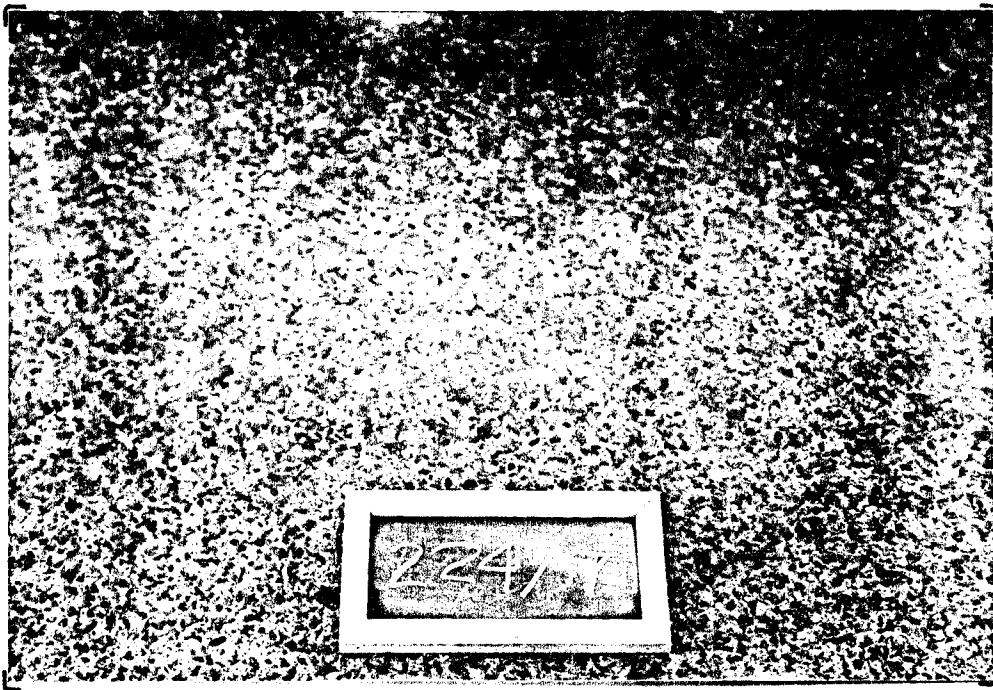
90/545 - Chuckholes in wheel path. Heavy high speed traffic. Paved 1983. Rated 21



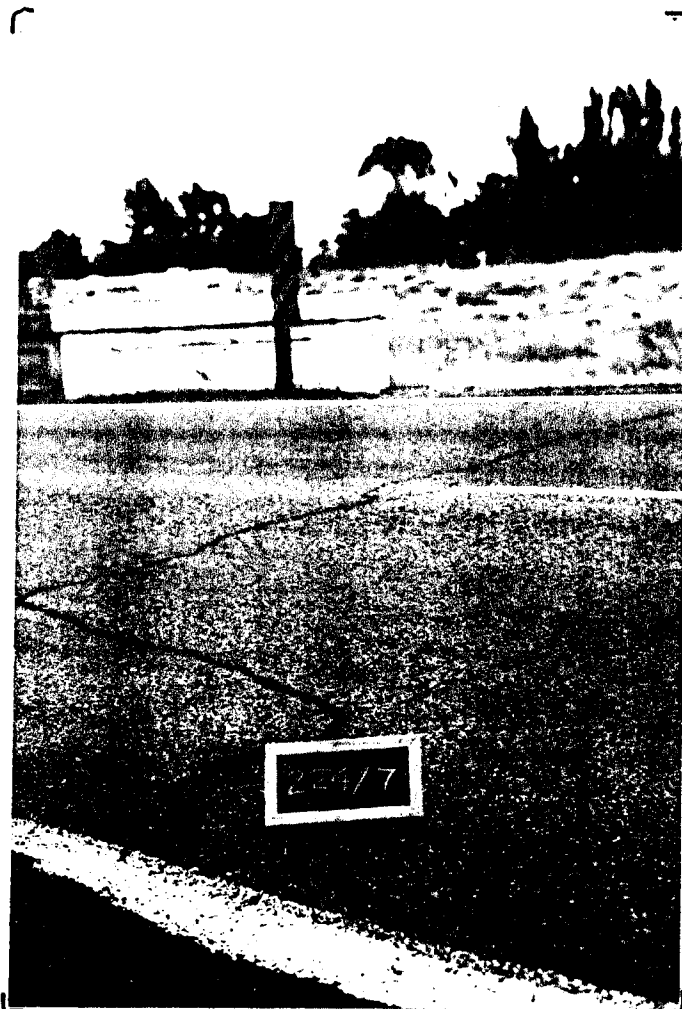
171/5 - Surface open and shows little wear. Moderate, medium speed traffic. Paved 1983. Rated 1



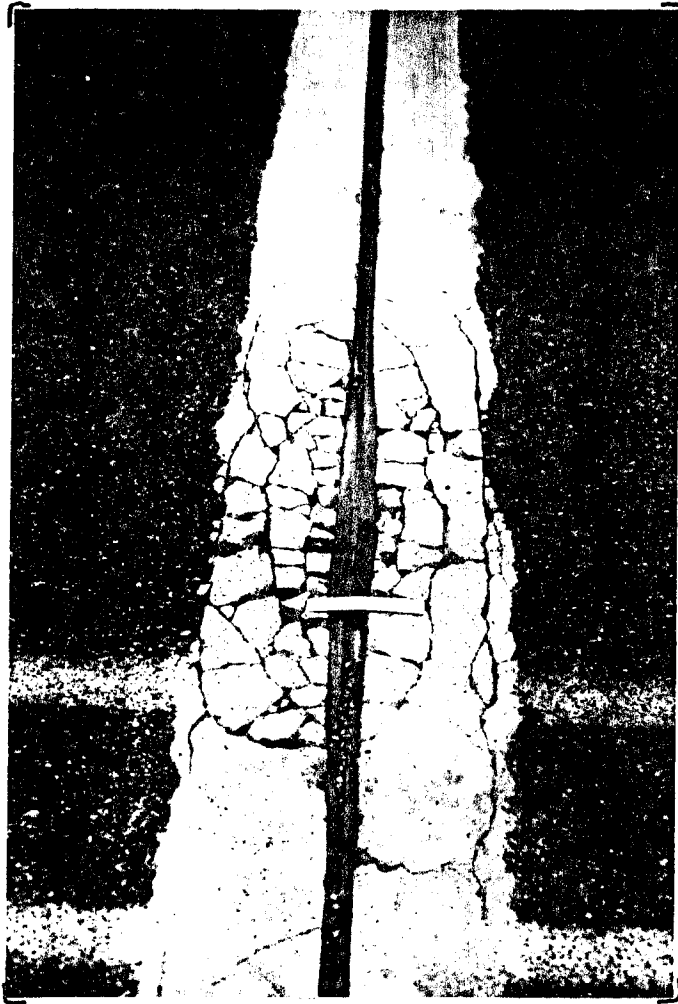
171/5 - Crack at pavement seat.



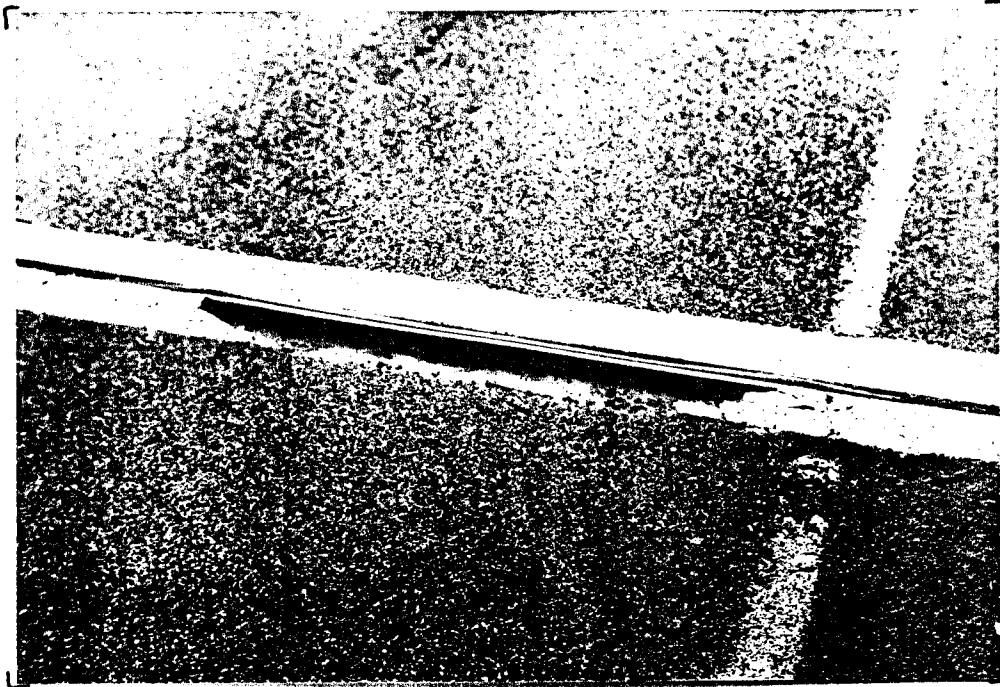
224/7 - Surface appears to be closed but no other signs of distress. Light, slow speed traffic. Paved 1982. Rated 4.



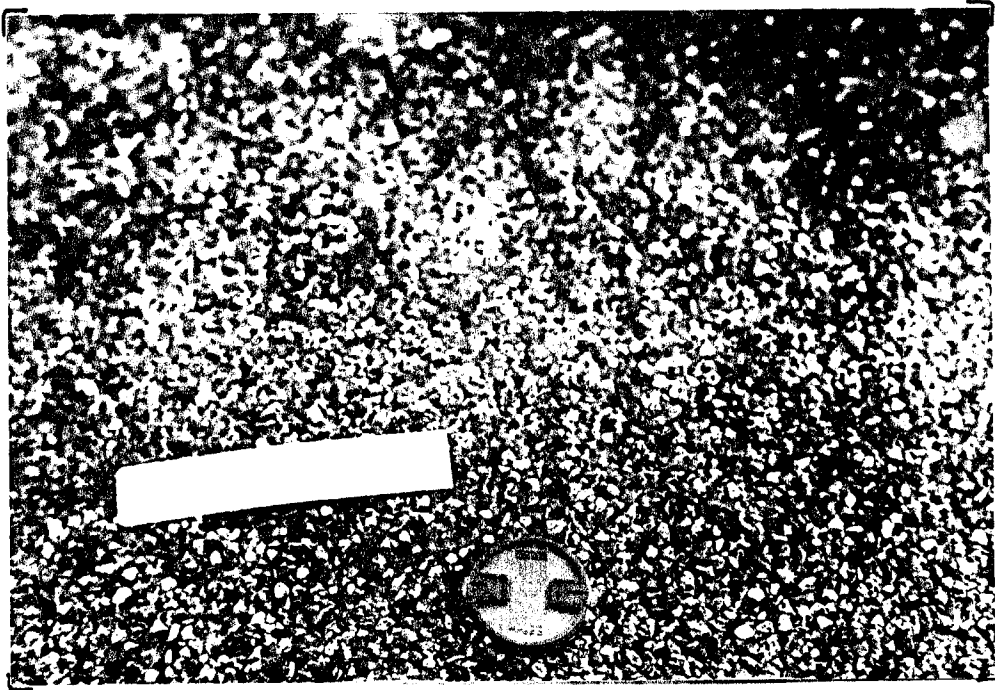
224/7 - Crack at pavement seat.



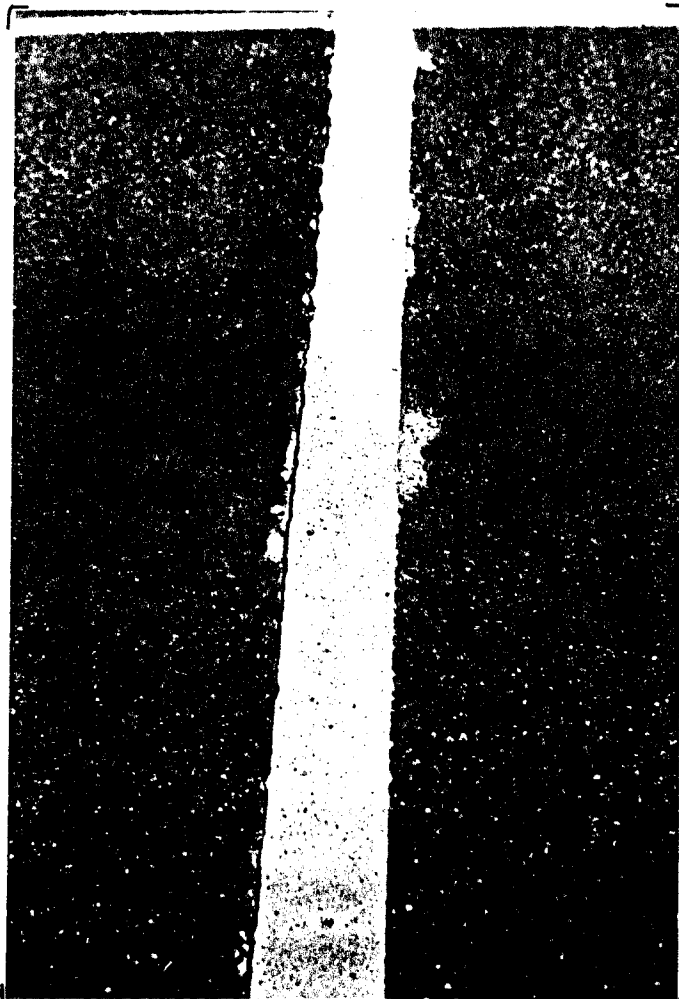
530/124 - Joints coming apart.
Moderate, high speed traffic.
Heavy log truck traffic.



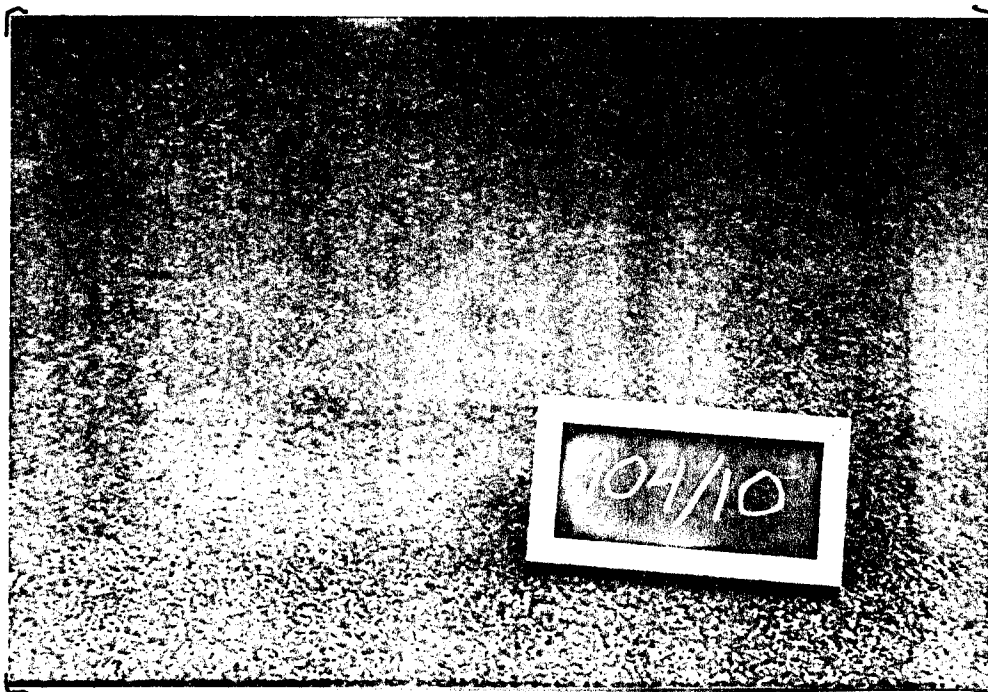
530/124 - Intermediate expansion joint.



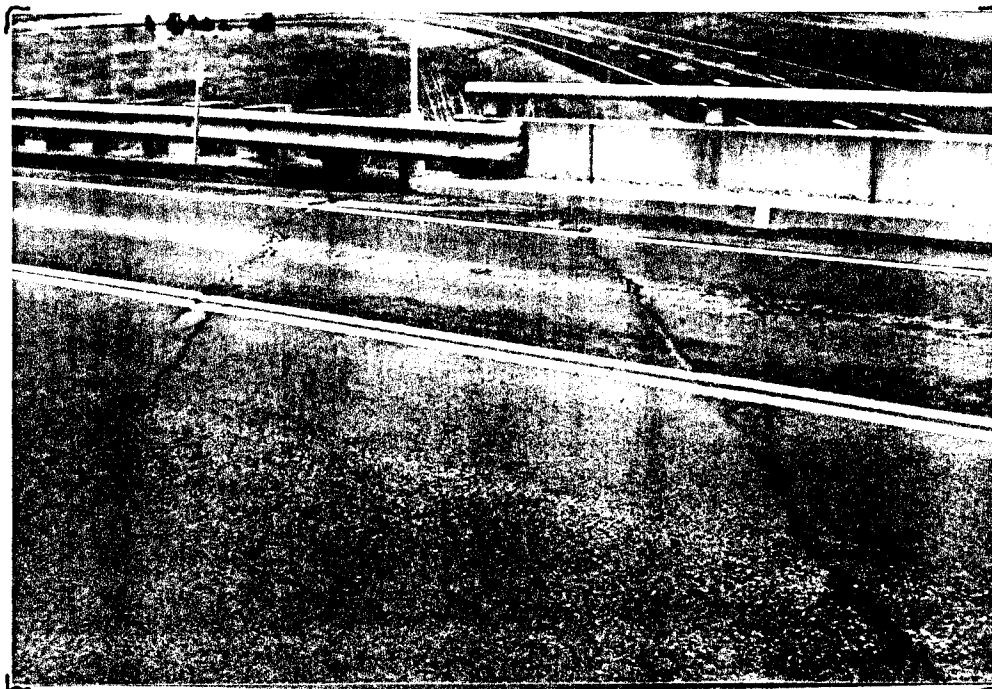
530/124 - Surface has good texture and is very open. Paved 1983. Rated 2



530/24 - Sawcut joint.



904/10 - Surface generally in good condition. Few over-rich spots. Moderate medium speed traffic. Paved 1980. Rated 1



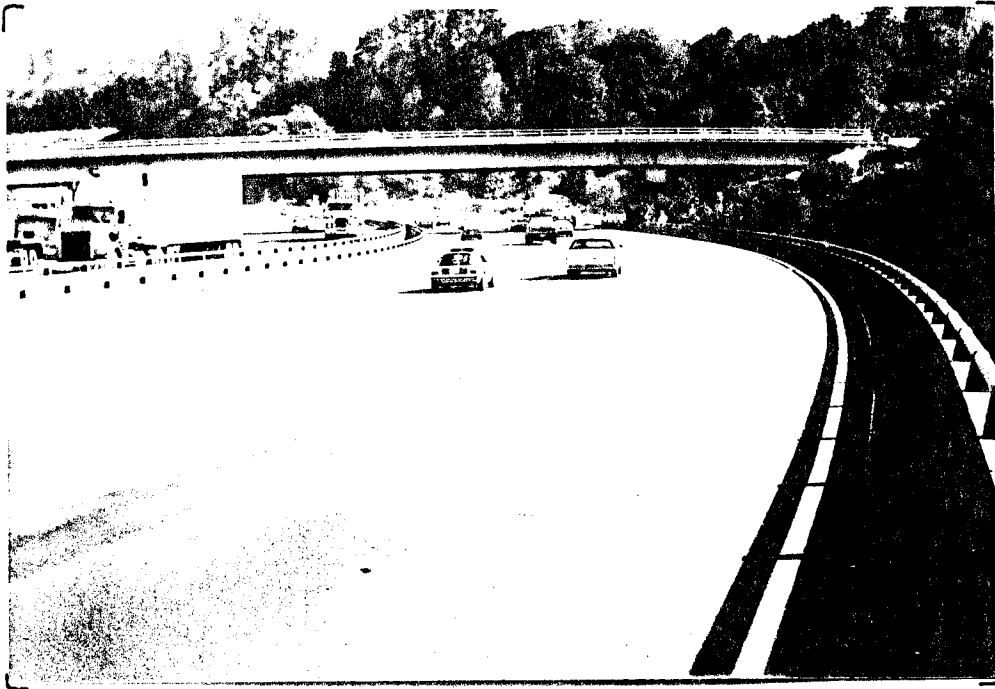
904/10 - Unusual crack pattern at north end of bridge.



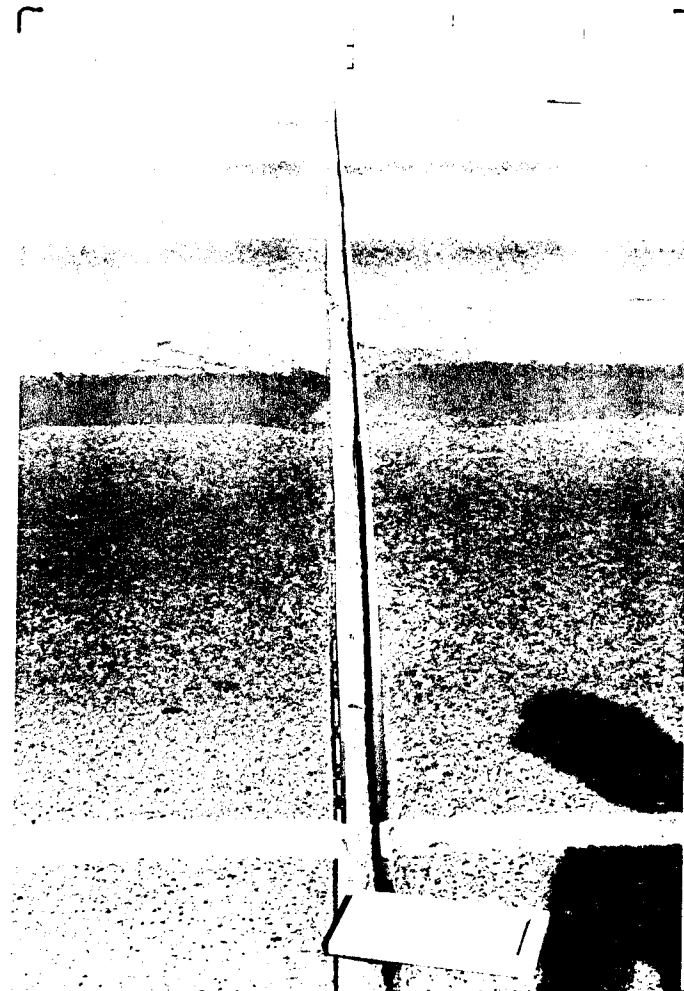
904/10 - Northerly crack of previous photo.



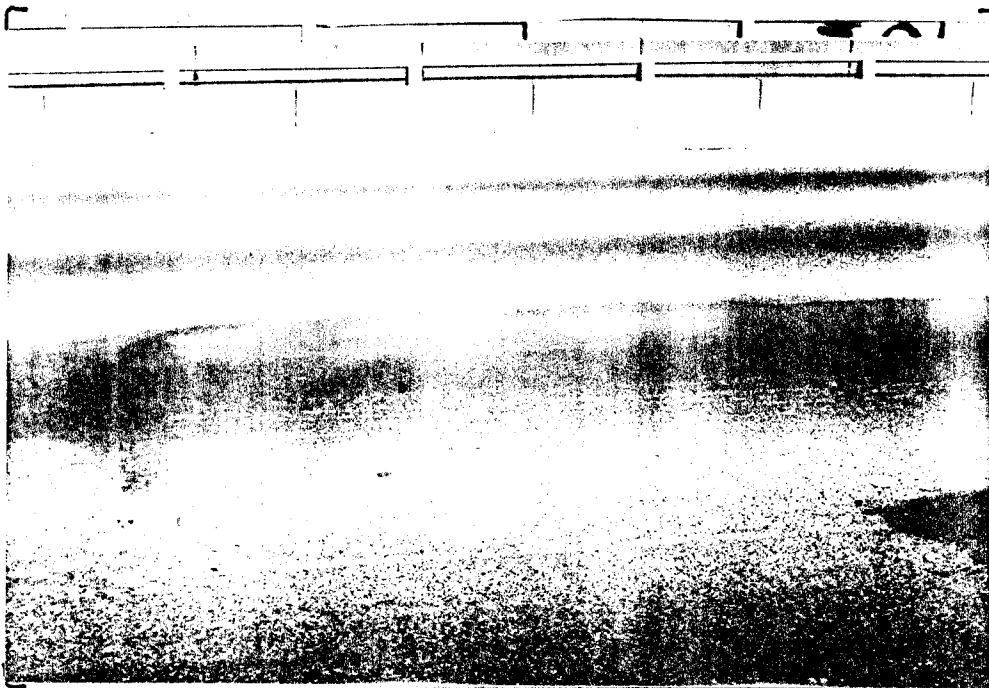
904/10 - Unusual crack pattern repeated at south end of bridge.



5/526 - Severe raveling in left wheel path. Heavy high speed traffic. Paved 1976. Rated 11



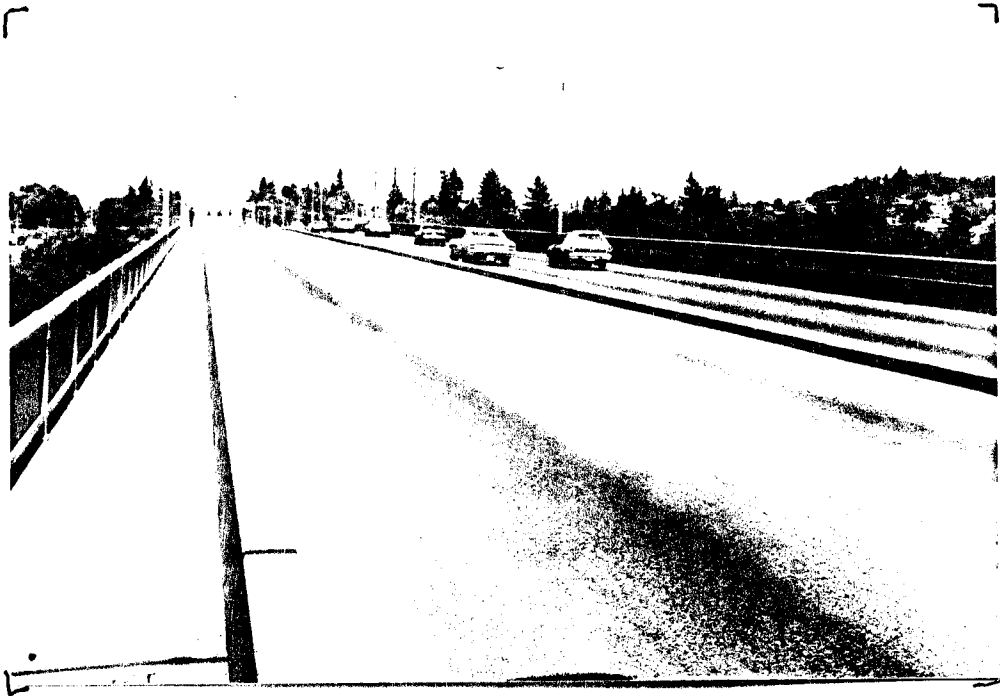
5/526 - Typical expansion joint.



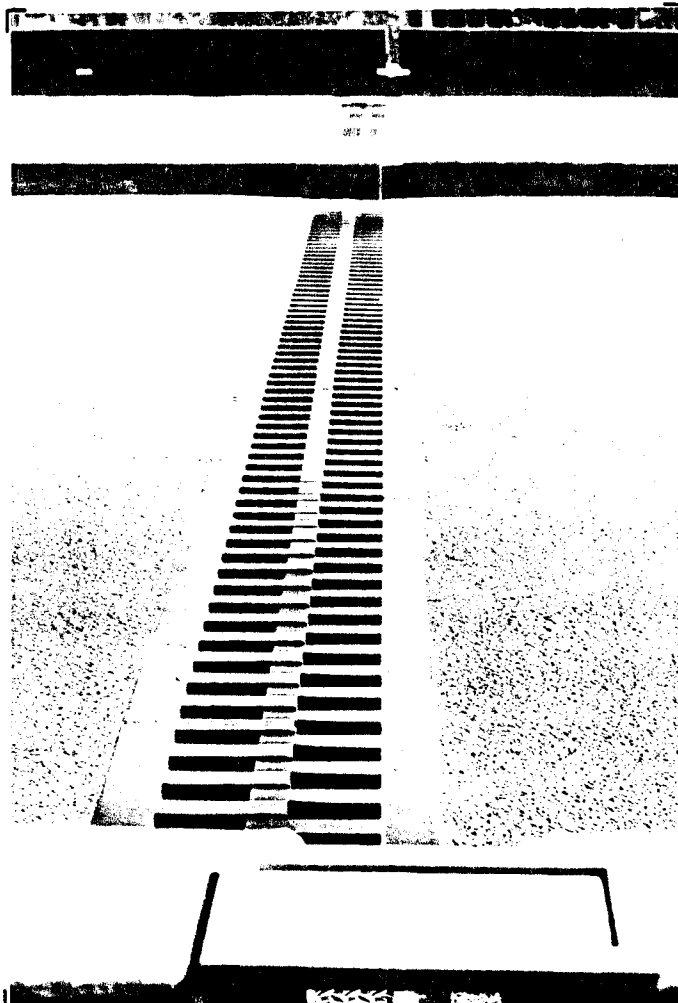
5/526 - Ravelled areas have been repaired.



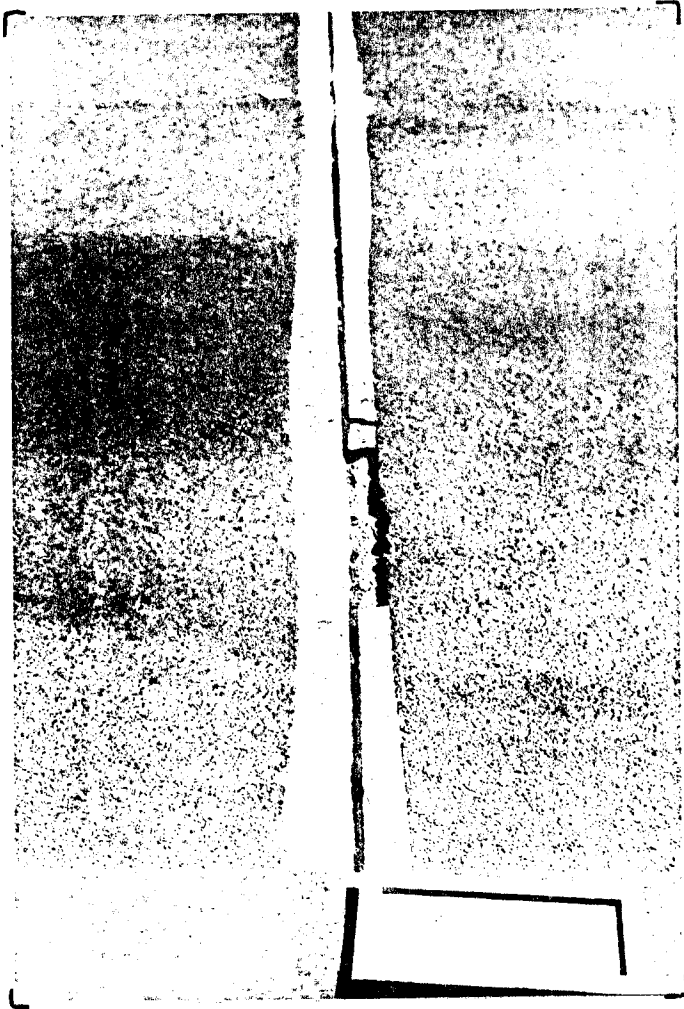
5/526 - Some rutting and settling at pavement seat.



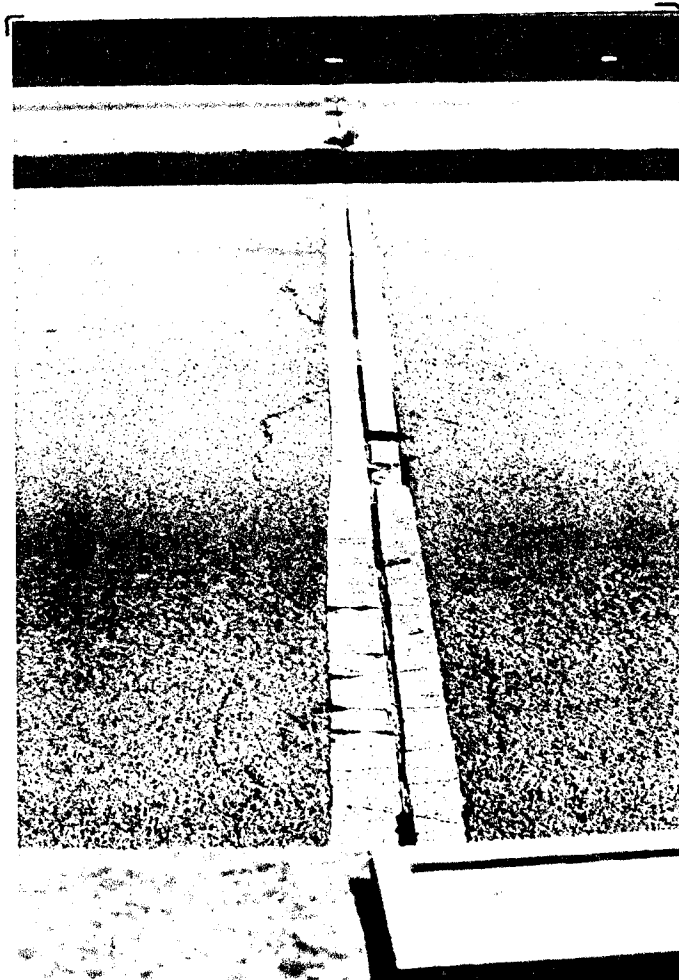
303/12 - Surface shows no sign of distress. Texture closed due to many years of sanding. Moderate to light slow speed traffic. Paved 1979. Rated 7.



303/12 - Expansion joint at approach span.



303/12 - Expansion joint in
truss span.



303/12 - Expansion joint in
truss span.

APPENDIX B



Washington State
Department of Transportation

INTRA-DEPARTMENTAL COMMUNICATION

DATE: May 30, 1984

FROM: J. R. Stephenson

PHONE:

SUBJECT: Open Graded Asphalt

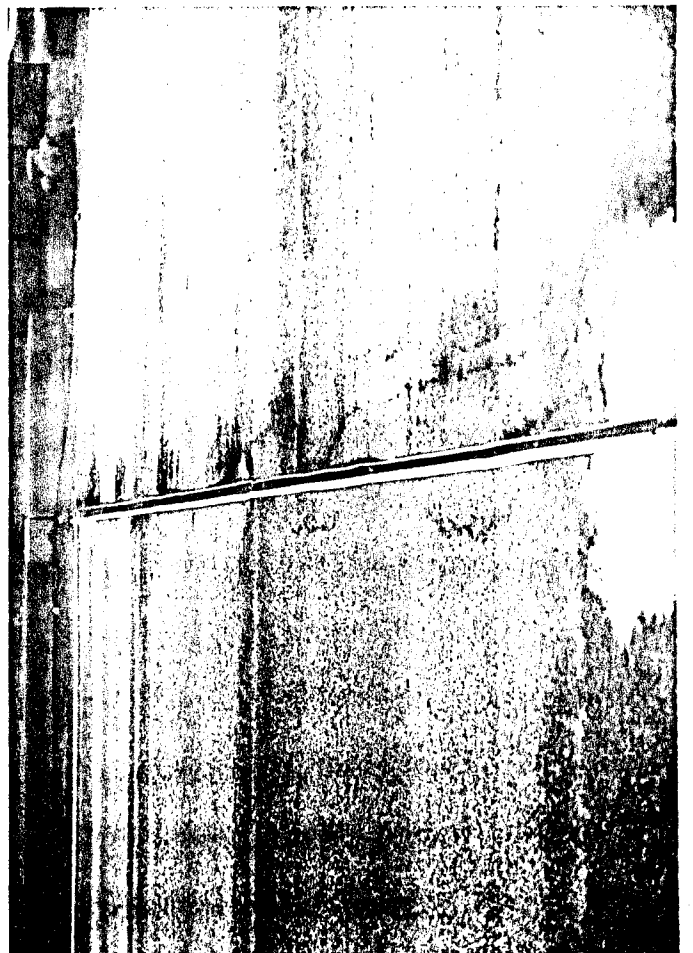
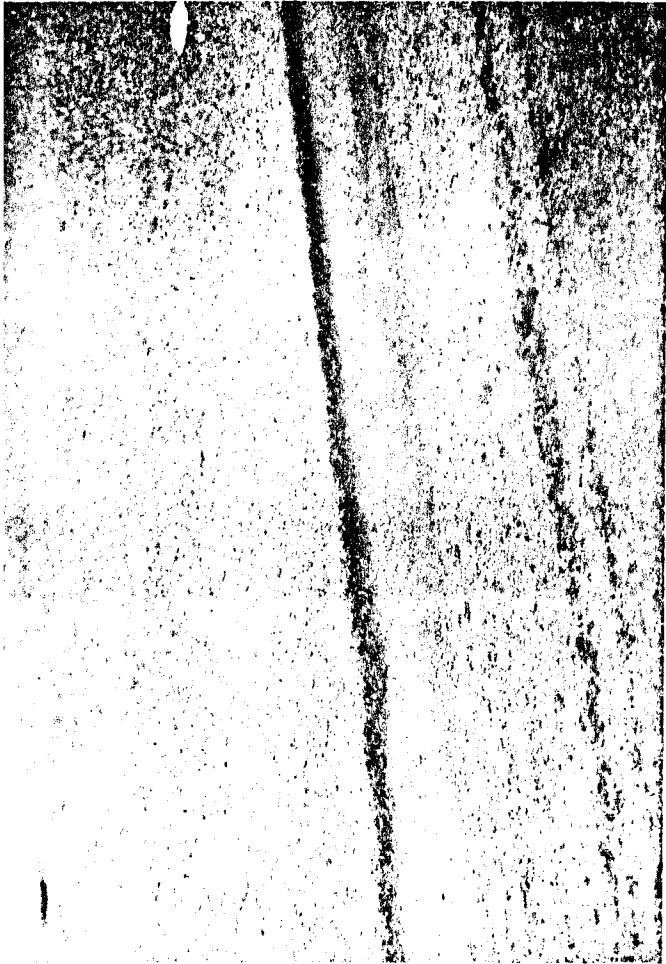
TO: A.J. Peters

In response to your IDC of May 8, 1984, we have identified two locations where Class D has had excessive wear. On SR 5 the Snohomish River Bridges 5/645E and 5/645W were resurfaced in 1982. These have worn down to the Class G. Also on SR 5, the NB inside lane of the 4th Street Overcrossing in Marysville has shown excessive wear. This bridge was also resurfaced in 1982. Typically wear begins at the expansion joints and extends from there. We do not have pictures of these bridges, however, the attached pictures of the Duwamish River Bridge show the pattern of wear and what happens at the expansion joints.

We look forward to your review of these structures, and request that your review include contact with Tiny Miller, our Bridge Maintenance Superintendent.

AES:db
Attachment
cc: C.S. Miller
File

6/5/84
ADP
RHG
I assume Ron RLS ^{RLS}
is doing the evaluation.
See he retains this in
his file.





DATE: May 8, 1984

FROM: A. J. Peters/R. H. Gietz

PHONE:

SUBJECT: Open Graded Asphalt

TO: R. E. Bockstruck/J. R. Stephenson

Your IDC concerning performance of Class D ACP has been referred to us by Mr. Krier for comment. We were surprised to learn of the service complaints against Class D mix as, to our knowledge, it was serving adequately. We assume you are referring to other areas than the Duwamish river bridge and the Renton S Curves. While those areas have shown considerable wear, it needs to be borne in mind that the service life of an ACP system under I-5 or 405 traffic is going to be somewhat short. These two installations have stood up for about 6 or 7 years to date and that is not too unsatisfactory.

The incorporation of Class D into the ACP overlay-membrane system was intended to be as a protective measure for the waterproofing membrane. Protective in that, as the ordinary pavement wear occurred, the Class G dense graded mix would be exposed and provide a visual indication of wear permitting the structure to be programmed for renovation before wear progressed to damage the membrane.

However it was not intended that an inadequate service life be accepted as part of this system. There are several installations of which we are aware where Class D has exhibited good performance.

We have some causes and remedies in mind for poor service life for Class D. We would be interested in looking in detail at the unsatisfactory performance you report in order to correct or revise our Class D paving procedure. Please advise us of the particular locations where Class D has been unsatisfactory so that we can review them in detail.

AJP:db
RHG

INTRA-DEPARTMENTAL COMMUNICATION

E: February 6, 1984

M: J. R. Stephenson *JRS*

SUBJECT: Open Graded Asphalt

R. H. Krier
KF 01

A number of bridge deck overlays have used asphalt concrete pavement Class D as a wearing course. These have not worked satisfactorily and we want to eliminate using Class D and use Class B instead.

The wear around the expansion joints is excessive. Rain and frost action ravels the pavement during the winter. The expansion joints now project up to an inch above the surrounding pavement. Another problem is that the asphalt retains water. When freezing conditions occur, with the water retained in the asphalt pumping to the surface, a sheet of ice forms on the bridge decks. This creates an extraordinarily hazardous condition that salting does not rapidly cure. Also, traffic volumes in the Seattle area are the highest in the state, and the Class D wearing course does not have enough longevity.

We do not know what the experience has been for Class D overlays in the rest of the state, and they may be working satisfactorily elsewhere. In this district, however, the experience has not been good and we want to use a Class B overlay where asphalt is used.

Your comments will be appreciated.

AES:db
cc: C.S. Miller
File