SPS–3 CONSTRUCTION REPORT

SHRP North Atlantic Region

PAVEMENT
MANAGEMENT
SYSTEMS
LIMITED

Pavement Management Systems
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October 1990

PAVEMENT MANAGEMENT SYSTEMS

MEMORANDUM

TO:	Distribution, see below	**DATE:**	November 20, 1990
FROM:	Bill Phang	**FILE REF:**	13.2.3
SUBJECT:	SPS-3 Construction Report		

There are eight (8) SPS-3 projects in the North Atlantic Region which were constructed in 1990. These projects are located in Maryland, New York, Pennsylvania, Virginia, Ontario and Quebec.

Three of the four preventive maintenance treatments, the crack sealing, the chip sealing, and the slurry sealing, were constructed by a single contractor using the same materials, equipment and labor force in the late summer

This construction report provides a brief overview of the projects, indicates where they fit in the national experiment, summarizes the contractual arrangements, outlines the pre-construction field work, the treatment application rates, the construction schedules, and contains construction notes, highlights, and photos of the work.

The report may be of some value in accounting for differences in performance of the treatments for these eight projects

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SPS-3 CONSTRUCTION REPORT
North Atlantic Region

Summary

The SPS-3 Experiment addresses questions of the cost effectiveness and optimum timing of application of preventive maintenance treatments to asphalt surfaced pavements

Six highway agencies in the SHRP North Atlantic region, Maryland, New York, Pennsylvania, Virginia, Ontario and Quebec, are participating in the SHRP Preventive Maintenance SPS-3 Experiment Four types of preventive maintenance are included in the experiment, crack sealing, chip sealing, slurry sealing, and thin asphalt concrete overlays

The participants agreed to have a single contractor operate the same experiment and using the same materials, carry out the crack sealing, the chip sealing, and the slurry sealing work at each of their agreed on sites The contract was administered by the Federal Highway Administration, Eastern Federal Lands

This report describes the application of these treatments on eight projects during the late summer of 1990.

PMS-NARCO October 1990

The SPS-3 Experiment in the North Atlantic Region

Introduction

The SPS-3 experiment addresses the questions of cost effectiveness and optimum timing of preventative asphalt pavement maintenance Four types of preventative maintenance treatments representing a range of costs, crack sealing, chip sealing, slurry seal, and a thin asphalt concrete overlay were selected to be included in the experiment. These treatments are to be applied to asphalt pavements in different stages of deterioration, good, fair, and poor conditions. The experiment was designed to include the same environmental factors used in the GPS experiment, and to cover differences in subgrade, traffic and pavement structure. The experiment is illustrated in Figure 1.

The SPS-3 experiment was designed under SHRP contract H-101 by the Texas Transportation Institute, under the direction of Dr. Roger Smith.

Participants in the North Atlantic region met on several occasions to determine specifications, construction and traffic control details, sampling and testing, and data collection needs It was agreed that to avoid introducing construction variables such as workmanship and materials, all of the SPS-3 sites in the region would be done by one contractor using the same equipment and the same materials for the crack seal, the chip seal and the slurry seal. The thin overlay would be done by individual participants. In order to make this possible, the crack seal, the chip seal and the slurry seal work was contracted through the Federal Highway Administration, Eastern Federal Lands Highway Division. Participants agreed to reimburse FHWA. Ten sites were initially proposed

A pre-bid meeting to provide potential bidders with details of the work, to introduce the clients and the supervisory field staff, and to present information on border crossings, etc. was held in Amherst, N.Y., March 29, 1990.

Technical proposals received by FHWA were evaluated April 17, 1990. FHWA then proceeded to implement using their two stage bid process. By an evaluation team consisting of Ivan Pecnik, SHRP RE, Frank Meyer and Andrew Brigg of PMS, Tom Wolschied, NY DOT, Gary Brown, Jack Springer and Alan Teikari of FHWA-EFL, only one of the two proposers was found acceptable and asked to provide a bid. Unfortunately this bid was deemed to be unacceptably high and was initially rejected, but negotiations with the contractor continued. The final negotiated price caused two of the participants to only do one SPS-3 site each, reducing the total to 8 sites. Details of these sites appear in Table 1.

The contract was awarded to Suit-Kote Corporation, Cortland, N.Y., by FHWA on August 3, 1990. A pre-contract meeting was held in Amherst, August 7, 1990, and a tentative schedule was agreed on. Notice to proceed was issued August 8, 1990 and work began on August 20, 1990.

FIGURE 1

SPS–3 AC MAINTENANCE TREATMENTS

NORTH ATLANTIC REGION

MOISTURE / TEMPERATURE / SUBGRADE / TRAFFIC / SN RATIO / CONDITION		WET								DRY							
		FREEZE				NO FREEZE				FREEZE				NO FREEZE			
		FINE		COARSE		FINE		COARSE		FINE		COARSE		FINE		COARSE	
		LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
G	<1	1 NY	7 ON	13	19												
	>1	2	8	14 MD	20 VA												
F	<1	3	9	15 NY	21												
	>1	4	10 QB	16	22												
P	<1	5	11	17	23 ON												
	>1	6	12 PA	18	24												

Layout of Projects

Each of the SPS-3 projects includes a control section which will have no maintenance done during the monitoring period, and which will serve as the standard against which the performances of the preventative maintenance treatments will be evaluated The GPS section into which the SPS-3's are tied, will have normal maintenance done. Additionally participants were encouraged to add supplementary sections where additional different treatments of their own choosing were to be installed

During the early stages of selection and verification of the sections, transitions of 100' were used Later, transitions were made longer to accommodate the practicalities of equipment run-out. As a consequence and to accommodate problems during construction, on-site adjustments were sometimes made to the re-arranged sequence of treatments There was a need after completion of the construction work to re-document the layouts of the project The final layouts are listed in Table 2. The order in which the sections are listed is in the direction of traffic in the GPS lane.

Pre-Construction Data Collection

Potential candidate sections were identified by TTI in mid 1989, using data from approved GPS sections. Layout of the SPS-3 sections was completed by the end of 1989 but verification cores and borings of the sections in Ontario and Quebec were not obtained until the spring of 1990 as shown in Table 3. These cores were stored in the regional office until the testing laboratory was named and instructions to deliver were received. The cores were dispatched to Western Technology in Phoenix, Arizona, September 1990, along with stockpile samples of slurry seal and chip seal aggregates.

Data collected at SPS-3 sites prior to construction include profile measurements, FWD measurements, PASCO photography, and manual distress surveys Dates when these measurements and data were collected are shown in Table 3.

Post-Construction Data Collection

Profile measurements, FWD measurements, and manual distress surveys of SPS-3 sections after construction are scheduled for completion before the end of 1990

Construction

The contractor, Suit-Kote Corporation, Cortland, N.Y., moved his equipment into Canada, August 16, 1990, with no problems encountered at the border. Mr Greg Williams, the Canadian SHRP Coordinator, had worked with Suit-Kote and had prepared the way with Canada Customs and Immigration.

Calibration of the equipment took place in the Ontario Ministry of Transportation maintenance patrol yard at Hwy 93 and 400 on August 17th and 18th, 1990

Construction on the SPS-3 sections on Highway 400 started on August 20, 1990, and were completed that day. However difficulties were experienced with the chip seal emulsion and the subcontractor Saugeen Road Spraying, Durham, did not participate in the remaining SPS-3 projects

Construction continued in Ontario, Quebec, New York, Pennsylvania, Maryland and Virginia ending on September 18, 1990.

A construction report and daily report highlights follow.

Information available at this time for state supplementary experiments is presented in Appendix C

TABLE 1
SPS-3 NORTH ATLANTIC REGION

CELL	GPS NUMBER	COND CAT	KESAL /YR	SN RATIO	STATE
14	241634	F G	17	1.02	Maryland
15	361643	F	80	0.39	New York
1	361644	G	80	0.70	New York
12	421605	P	140	1.22	Pennsylvania
20	511023	F G	430	1.26	Virginia
7	871620	G	160	0.39	Ontario
23	871622	P	180	0.65	Ontario
10	891021	F	150	1.37	Quebec

TABLE 2
SPS-3 PROJECT LAYOUTS

STATE	HWY.	LOCATION	SECTION I.D.	TREATMENT	DATE COMPLETED	REMARKS
Maryland	ST 90 EB	Ocean City	241634	GPS	1976	
			24A310	Thin Overlay	11/05/90	
			24A330	Crack Seal	09/12/90	24A320 (2)
			24A320	Slurry Seal	09/12/90	24A330 (2)
			24A340	Control	1976	
			24A350	Chip Seal	09/12/90	
			24A311	Overlay (1)	11/05/90	
			24A331	Crack Seal	11/30/90	anticipated date
New York	ST 4 NB	Glen Falls	361643	GPS	1980	
			36A340	Control	1980	
			36A310	Thin Overlay	08/16/90	
			36A320	Slurry Seal	09/06/90	
			36A330	Crack Seal	09/06/90	
			36A350	Chip Seal	09/06/90	
			36A321	Micro Slurry (1)	08/30/90	reversed in manual
			36A331	Crack Seal (1)	06/01/90	distress surveys
New York	ST 3 WB	Cranberry Lake	36B331	Crack Seal (1)	05/09/90	
			36B350	Chip Seal	09/04/90	
			36B340	Control	1980	
			36B330	Crack Seal	09/04/90	
			36B351	Chip Seal (1)	08/23/90	
			36B320	Slurry Seal	09/04/90	
			36B310	Overlay	08/14/90	
			361644	GPS	1980	
			36B352	Chip Seal (1)	08/23/90	
			36B353	Chip Seal (1)	08/23/90	1000' initially,
			36B354	Chip Seal (1)	08/23/90	but split in 2

(1) State Supplementary Sections
(2) As initially laid out and monitored by PASCO and FWD

TABLE 2 (cont.)

SPS-3 PROJECT LAYOUTS

STATE	HWY.	LOCATION	SECTION I.D.	TREATMENT	COMPLETED	REMARKS
Pennsylvania	ST 147 NB	Lewisburg	42A340	Control	1971	
			42A320	Slurry Seal	09/10/90	
			42A310	Thin Overlay	06/05/90	
			42A350	Chip Seal	09/11/90	
			42A351	Chip Seal (1)	09/11/90	42A330 (2)
			42A330	Crack Seal	09/10/90	
			421605	GPS	1971	
Virginia	IH 95 NB	Petersburg	511023	GPS	1980	
			51A340	Control	1980	
			51A310	Thin Overlay	10/23/90	
			51A350	Chip Seal	09/18/90	
			51A330	Crack Seal	09/18/90	
			51A320	Slurry Seal	09/18/90	
			51A321	Slurry Seal (1)		
Ontario	400 SB	Moonstone	871620	GPS	1981	
			87A310	Thin Overlay	08/29/90	
			87A320	Slurry Seal	08/20/90	
			87A330	Crack Seal	08/20/90	
			87A340	Control	1981	
			87A350	Chip Seal	08/20/90	
			87A311	Overlay (1)	08/28/90	Dynapave (3)

(1) State Supplementary section
(2) As initially laid out
(3) As initially constructed as

TABLE 2 (cont.)
SPS-3 PROJECT LAYOUTS

STATE	HWY.	LOCATION	SECTION I.D.	TREATMENT	DATE COMPLETED	REMARKS
Ontario	11 NB	Bracebridge	871622	GPS	1976	
			87B310	Thin Overlay	09/13/90	
			87B320	Slurry Seal	08/22/90	
			87B330	Crack Seal	08/22/90	
			87B340	Control	1976	
			87B361	Dynapatch (1)	08/27/90	87B250 (2)
			87B362	Dynapatch (1)	08/27/90	87B321 (2)
			87B311	Double Overlay (1)	09/13/90	
			87B360	Wheel Path Dynapatch (1)	08/20/90	
Quebec	40 WB	Trois Riviere	891021	GPS	1983	
			89A310	Thin Overlay		
			89A320	Slurry Seal	08/31/90	
			89A330	Crack Seal	08/31/90	
			89A340	Control	1983	
			89A350	Chip Seal	08/31/90	

(1) State supplementary section
(2) As initially laid out

TABLE 3
SPS-3 DATA COLLECTION

	VERIFICATION CORES	FWD	PASCO	MANUAL DISTRESS	PROFIL-OMETER
PRE-CONSTRUCTION					
MD 241634	10/31/89	04/16/90	07/02/90	09/12/90	03/26/90
NY 361643	09/12/89	05/22/90	09/06/90	09/06/90	06/08/90
361644	09/13/89	05/24/90	08/01/90	09/04/90	06/06/90
PA 421605	08/11/89	05/11/90		09/10/90	05/18/90
VA 511023	08/13/89	02/22/90		09/18/90	01/31/90
ON 871620	05/08/90	06/04/90	07/26/90	09/20/90	06/18/90
871622	05/09/90	06/06/90	07/26/90	08/21/90	06/18/90
QB 891021	05/16/90	06/11/90	08/14/90	08/31/90	06/24/90
POST-CONSTRUCTION					
MD 241634		10/25/90		10/25/90	
NY 361643		10/09/90		10/09/90	10/25/90
361644		10/11/90		10/11/90	10/24/90
PA 421605		10/17/90	09/26/90	10/17/90	10/30/90
VA 511023					
ON 871620		10/03/90		10/03/90	10/18/90
871622		10/02/90		10/02/90	10/17/90
QB 891021		10/15/90		10/15/90	10/23/90

PMS NARCO

SHRP SPS-3 Project Report
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GENERAL INFORMATION - CONTRACT CONSTRUCTION

Eight SPS-3 sites were available adjacent to GPS sites to carry out maintenance treatments in 4 States and 2 Provinces as follows.

	Hwy.	Location	State	GPS	SPS-3	Date of Work
1	400	Moonstone	Ontario	871620	87A300	Aug 20
2.	11	Bracebridge	Ontario	871622	87B300	Aug 21, 22, 23, 27
3	40	Three Rivers	Quebec	891021	89A300	Aug 31
4	3	Cranberry Lake	New York	361644	36B300	Sept 04
5.	4	Fort Ann	New York	361643	36A300	Sept 06
6	147	Lewisburg	Pennsylvania	421605	42A300	Sept. 10, 11
7	90	Ocean City	Maryland	241634	23A300	Sept. 12
8	195	Petersburg	Virginia	511023	51A300	Sept 18

The treatments started on Highway 400 in Ontario on August 20/90 and ended on Highway 95, in Virginia on September 18/90

Each contract site consisted of three (3) treatments; chip seal, slurry seal and crack seal, the purpose of which was to study the effectiveness of various pavement maintenance treatments. Each treatment was 500' in length with in most cases a 200' transition zone. The same treatment was to be used on the adjacent trial lane so that if any corrections were needed, they could be made to the equipment or material on the test lane. Sheets were provided to obtain detailed data on each of the treatments at each site.

The contract required that the same materials, the same equipment and the same skilled people had to be used throughout the project

CONTRACTOR

The prime contractor was Suit-Kote Corporation from Cortland, New York. Suit-Kote planned to do the slurry seal and crack sealing treatments and Saugeen Road Spraying Co from Durham, Ontario to do the chip seal treatment as a sub-contractor

CONSTRUCTION MATERIALS SOURCES

For Slurry Seal treatment:

Slurry Seal Aggregate	General Crushed Stone Co. Honeoye, NY (photo 2)
Mineral Filler	Hydrated lime from Lee Lime Corp., Mass
AC-10	Exxon Corp. in Bayonne, NJ
Emulsion (CSS-1h)	Produced by Suit-Kote at Cortland, NY

For Crack Sealing treatment.

Sealant	Polymer Modified Rubber Asphalt Crack Sealant Material from Koch Materials Ltd

For Chip Seal treatment.

Chip Seal Aggregate	Eastern Rock Products, Little Falls, NY (photo 1)
Emulsion (HFRS2)	T.D. Pounder Emulsions Ltd Brampton, Ontario

PROJECT PERSONNEL

Project manager	Cullen (Butch) Brooks Eastern Federal Lands Div FHWA
Contract Supervisor	Kevin Cunningham, Suit-Kote
SHRP Representative	Alex Rutka of Pavement Management Systems with assistance at various times with Mark Stinson (FHWA Trainee) and Mel Stott, Pavement Management Systems

Following the pre-construction meeting held in Buffalo on August 7, the contractor prepared a tentative schedule of work - Appendix A.

PRE-CONSTRUCTION WORK

Calibration and Demonstration

Tom Freeman from TTI supervised a calibration of the equipment and demonstration activities which were done in the Ministry of Transportation Patrol yard at Highway 93 and 400 or on the adjacent municipal road Some adjustments were required to the chip spreader, the chip seal emulsion distributor and the slurry seal distributor The chip seal emulsion also needed a correction It was also realized that the Canadian equipment gave results in imperial gallons The target and application rates had to be adjusted to US gallons

Materials Acceptance Sampling

Due to the delay in awarding this contract, the only materials sampled at the production site were the aggregates for chip and slurry seals on August 15 They were packaged, labelled and shipped as follows:

Chip seal aggregate	200 lbs to SHRP designated Lab-Western Technology, Arizona 50 lbs to Dr Roger Smith, TTI
Slurry seal aggregate	200 lbs to Western Technology 200 lbs to C Robert Benedict, I S S A

The samples of all other materials for acceptance and mix design were mostly taken at the first construction site on August 20

Bituminous materials (emulsions)

Chip seal	3 gallons to Western Technology 2 gallons to Dr. Roger Smith, TTI

Note due to a change in the emulsion source from Pounder to Suit-Kote, these samples were re-submitted on August 31.

Slurry seal	3 gallons to Western Technology 3 gallons to I S.S A
Mineral filler	2 lbs to Western Technology 2 lbs to I S S A
Crack sealant	10 lbs to Western Technology at the beginning and again mid-way through the work in the Region.

Condition Surveys

Pavement condition surveys for the SPS-3 and State experimental sites were carried out immediately prior to the treatments if they had not been done within the past 90 days This primarily involved a crack and rutting survey

Securing Treatment References

The SPS-3 and the State Experimental sites were each 500' in length and were well marked out with chainages starting with appropriate treatment numbers at 0+00. Each treatment had markings at 100' intervals ending at 5+00. The transition zones were generally 200'. Many of the sites also had blue SHRP signs at the start of each treatment indicating type of treatment In all cases except New York the treatments started at the mid transition zone and ended midway through the next transition zone. All treatments in New York started at 0+00 and ended at 0+00 of the next treatment

Because of the treatments, the existing markings would disappear so each 0+00 position of all treatments were secured by PK nails on the paved shoulders or iron bars at the edge of gravel shoulder. These references were used to re-establish the original paint markings after the treatments were completed.

DURING CONSTRUCTION WORK

Sampling and Measurements

Samples of materials during construction were marked, packaged and shipped to the SHRP Designated Laboratory, Western Technology, Phoenix, Arizona. These were as follows:

Bituminous Materials for·

Chip seal	2 quarts/site
Slurry seal	2 quarts/site

Aggregates for·

Chip seal	20 lbs/site
Slurry seal	20 lbs/site
Slurry seal mix	1 per State or Province

All sampling and measurements were carried out in accordance with the memorandum of June 11/90 from Dr Smith, TTI to SHRP RCOC's and Regional Engineers regarding "Revision to RCOC SPS-3 Responsibilities". Sufficient information was collected to complete the data sheets provided for each of the treatments.

SUMMARY OF TREATMENTS

Chip Seal

The target application rate for the bituminous emulsion was 0.32 - 0 35 gals/sq. yd and for the aggregate 25 lbs/sq yd. In general the application rates for the emulsions and the aggregate were close to target.

The first chip seal treatment was placed on Monday, August 20 on Highway 400 near Moonstone, Ontario 87A350 The emulsion did not set up on the trial lane as quickly as expected The test lane was laid at 4:24 pm and it did not set up quickly either but it was opened to high speed traffic at 7:30 pm A lot of chips were being knocked around (photos 19, 20 taken 3 days later, Aug 23).

On Tuesday August 21, a new load of emulsion was obtained from Pounder for the Highway 11 Bracebridge, Ontario site 87B350. It was used on the trial lane around noon hour By 4 00 pm it was not setting up properly so it was bladed off the road (photos 10 and 11). A new batch was brought in by Pounder on Wednesday August 22 (photos 17 and 18). From a small demonstration site, it was evident that this emulsion would also not set up properly It was then decided that Suit-Kote would take over the chip sealing work from Saugeen and they brought in a fresh batch of emulsion from their plant in Cortland, N Y. on Thursday, August 23. From a small demonstration it was again evident that the chip seal emulsion was not setting up properly so Suit-Kote decided to study the problem over the weekend and arrive with a new batch on Monday, August 27

This new batch on August 27 did not set up quickly either, so it was decided due to scheduling limitations to forego the chip seal treatment on Highway 11 and move to Three Rivers, Quebec to Highway 40 89A300 (photos 21 and 22)

From here on the chip seal treatment performed well except for the Highway 147 Lewisburg, PA site 42A350. Here the trial lane did not set up quickly as expected so a new batch was brought in for the test lane the next day No further emulsion problems were experienced (photos 25 through 30) However, a major chip seal problem developed on Highway I 95 Petersburg, VA Here there was a malfunctioning of the chip spreader and the chips were not placed until about three quarter of an hour after the emulsion was sprayed. There was a considerable amount of dust flying chips at this site when it was opened to traffic (photo 33) It is not expected that this treatment will survive for very long (photos 34 through 37).

It was noted that·

1 A great deal of rutting was evident at several of the sites - 87A350, 89A350, 42A350 and 51A350.

2. Brooming was not carried out except at the Highway 400 site because of the slow setting time and at Highway I 95 because of the malfunctioning of the chip spreader

3 A lot of chip was knocked off at all sites before the chips stabilized

Slurry Seal

The target application rates were as follows.

Emulsion	12% by weight of aggregate
Aggregate	20 lbs/sq. yd
Mineral aggregate	1% by weight of aggregate

The actual application rates were within 5% of the target figure except for Highway 4 at Fort Anne 36A320 where the chip application rate was 16.9 lbs/sq. yd. or 15% below target. No adjustments were made to correct the surface conditions at any of these sites.

No technical problems were experienced with the slurry seal treatment but the following points were noted

1 At the beginning of this project, the chip seals were laid first. Half way through the project it was evident that it took longer for the slurry seals to cure, so then the seals were laid first.

2 It took longer for the rutted areas to cure

3 The distributor ran out of slurry at Station 4+75 at the Three Rivers, Quebec site 89A320 The trial lane was fine (photo 22)

4. Everyone seemed to be pleased with the slurry seal treatment

Crack Sealing

The crack routing and crack sealing operation went smoothly from start to finish The length of the cracks in the test lane varied from a low of 189' on Highway 90 at Ocean City to a high of 1059' on Highway 400 at Moonstone During the first half of the project the average width of routing was slightly more than 1 3/8" and the depth slightly more than 3/8" Then new blades were installed and the average width was a full 1 1/2" and the depth closer to 1/2". The sealant was placed slightly above the pavement but in general it levelled off at the pavement level. Toilet tissue was used to prevent the streaking of the sealant (photos 12 through 16, 23, 24)

Daily Report Highlights are in Appendix B

GENERAL COMMENTS

1. Weather - only one day could not be worked because of rain. This was on Highway 4 at Fort Ann, N Y. on September 5. It did rain on weekends and during some of the moves In September the mornings were foggy and it took until 10:00 am to burn the fog away.

2. Sample shipping - while in Canada Federal Express was used While in the U.S Priority Post was used similar to what was used in the North Central Region

3 Visitors - in general most of the sites were poorly attended The highest attendance rate was at the Highway 400 site in Ontario

4. Traffic - traffic was not a problem at any of the sites. In Ontario and Quebec, traffic control was provided by the Province. At all other sites, traffic control was provided by the contractor.

5. Working atmosphere - an excellent working relationship existed on this project

6. State concerns flying chips in chip seal treatment
skid resistance of slurry seal
retention of chips during snow plowing operations

A Rutka, Technical Supervisor
Pavement Management Systems

APPENDIX A

STRATEGIC HIGHWAY RESEARCH PROGRAM
Tentative Schedule For SPS-3

SCHEDULED	ACTIVITY	COMP DATE
Wed Aug 15	Mobilize - border crossing	
Thu Aug 16	Calibrate	
Fri Aug. 17	Demonstration Saugeen Quarry Entrance Rd , (Hwy 400 N off 93 N to first private road)	
Mon Aug 20	10.00 am start Ontario, Simcoe County, Ontario Highway 400 Site 1, SHRP site 871620 mobilization to site 2	Mon Aug 20
Tue. Aug 21	Ontario, Municipality of Muskoka, Ontario Highway 11, Site 2, SHRP site 871622 (high speed trucks)	Mon Aug 27
Wed Aug 22	Mobilization to Quebec	
Thu Aug 23	Quebec, St Maurice County, Quebec Highway 40 Site 3, SHRP site 891021	Fri. Aug 31
Fri Aug 24	Mobilization to New York site 4 (border crossing)	
Mon Aug 27	New York, St Lawrence County, New York Route 3 Site 4, SHRP site 361644 Mobilization to site 5	Tue Sep. 04
Tue. Aug 28	New York, Washington County, US Route 4 and NY Rt. 22 Site 5, SHRP site 361643	Thu. Sep 06
Wed Aug 29	Mobilization Pennsylvania site 6	
Thu Aug 30	Pennsylvania, Northumberland County, PA Route 147 Site 6, SHRP site 421605	Tue Sep. 11
Tue Sep 04	Mobilization to Maryland site 7	
Wed Sep 05	Maryland, Worcester County, Maryland Route 90 Site 7, SHRP site 241634 Mobilization to site 8	Wed Sep 12
Thu. Sep. 06	Virginia, Prince George County, Interstate Rt 95 Site 8, SHRP site 511023	Tue Sep. 18

SPS 3 HIGHLIGHTS
Inspection Report - by Alex Rutka

Aug 13/90 Several phone calls back and forth to PMS, Buffalo regarding.

- availability of aggregate stockpiles to sample
- testing equipment and supplies
- TC form requirements

Spoke with MTO people regarding Speedy Moisture meter, ASTM, AASHTO and Asphalt Institute references in the contract documents

Also spoke with Paul Arnill, Saugeen Construction and suggested he call Mike Freeman because he did not intend to calibrate the distributor according to the contract.

Picked up.

- 108 quarts and 24 gallons wide mouth plastic jars
- appropriate references from MTO library

Left Toronto for Buffalo

Aug. 14/90 Met Andrew at the Rainbow bridge, US Customs office and obtained a TC card. Phoned Dick Patterson at Eastern Rock Products at Little Falls for the chip seal aggregate and Bob Kilmer at General Crushed Stone Honeoye for slurry seal aggregate. Picked up some boxes at the post office and headed for Little Falls with Mark Stinson who was assigned to this project until the end of August by Ivan.

Aug. 15/90 Picked up five (5) bags (four for SHRP and one for Roger Smith) of the chip seal aggregate and 8 bags of the slurry aggregate and left them all at the PMS Buffalo office. Andrew prepared the appropriate letters and forms to get the van to Canada and its return to the US Andrew drove the van across the border at Fort Erie and we stopped at St Catherines to get some more supplies

Aug. 16/90
Hwy. 93 and
400 patrol yard
89B300

This was intended to be calibration day, it was not well organized No one knew where to go but every one finally met at the MTO patrol yard on Hwy. 93 and 400 at Hillsdale. The main people present were Tom Freeman, John Higgins, Butch Brooks, Paul Arnill, Mike Cavanaugh, Graham Jones, Rod Birdsall, Dan Suit and Steve (from Suit-Kote).

Because of a misunderstanding, the aggregate would not arrive until Aug 17 Therefore the only calibration done was with the chip seal emulsion distributor It was discovered that the viscosity was not right, so the distributor was sent back to Pounders at Brampton for a new load the next day. Tom came from Texas to do the calibrations

Aug 17/90 Hwy 93 and 400 patrol yard Moonstone	Most of the calibration and demonstration was done this day. - different size sprocket was needed in the slurry machine - the baby diaper pads used for the calibration of the distributor were messy and produced variable results. Carpet pads were better - the chip spreader produced variable results and had to be adjusted. - the demonstrations were carried out either in the patrol yard or on the nearby township road Everything was ready to go at 7.00 am as requested by Graham Jones at the Hwy 400 site Monday August 20.
Aug. 20/90 Hwy 400 87A300 Moonstone	Mel Stott met Mark Stinson and I at the site The test sites were secured and a condition survey was carried out. Because of some internal problems Saugeen did not show up until 11.00 am. In any case, the chip seal laid on the trial lane had some difficulty in setting up but the test lane was laid with chip seal at 4 24 pm. There was concern about it being so late There was no problem with the slurry or crack filling. The road was opened to traffic at 7:30 pm, the chips were flying and did not seem to be sticking Brooming was carried out before opening the road Many important people showed up. MTO (Magda Majesky, Dan Lynch, Tom Kazmierowski, Jerry Hajek, Roger Northwood, Guy Cautillo, Bruce Fraser from McAsphalt, Rod Birdsall, Dan Suits, Frank Meyer.
Aug 21/90 Hwy. 11 87B300 Bracebridge	Chip seal emulsion arrived at the Hwy. 11 site at 7.15 am at 110°. It took until 11:00 am to heat it to 150° and to lay it. The other sites in the trial lane were completed satisfactorily By 4:00 pm the chip seal was not setting up even with additional rolling, so it was decided to blade it off (Graham Jones, Tom Freeman, Butch Brooks). Then sand was added and compacted and bladed off The trial lane was opened to traffic at 7.30 pm. Because of this trouble, the test lane was not started It was mentioned that a retarder was added to the emulsion to carry it through all of the test sites.
Aug. 22/90	Slurry seal of the test site was laid at 8.40 am. Dan Suits and Rod Birdsall came up from NY and met with Mike Cavanaugh and Paul Arnill at the 400 site. The aggregate was not sticking and the rutted wheel paths had darkened up significantly. It was decided to bring the emulsion from the Cortland plant in NY the next day The test lane was opened to traffic at 1:00 pm It could have been earlier but MTO had run out of the Microsurfacing slurry and had to go back and get some more.
Aug. 23/90	The emulsion arrived from NY and it required heating until 8 00 am A 30' section was shot on a side road and the emulsion would not adequately set up. Because this section could not be closed on Friday, all work was stopped until Monday to give Suite-Kote a chance to review their material. Graham Jones had decided to place a micropatch on the chip seal section that was graded off because some asphalt patches were still present and he was concerned about the skid resistance. Suit-Kote decided to take over the chip seal work from Saugeen. Saugeen provided one roller. Suit-Kote would provide the chipper after completion of the Hwy. 11 test site

Aug 27/90

The distributor arrived from NY and a short demonstration of the chip seal on the side road showed that there was no improvement in the emulsion since August 23 It was decided by Tom Freeman, Butch Brooks, Rod Birdsall and Graham Jones to forego the Hwy. 11 chip seal site and go into Quebec.

Aug 29/90
Hwy 40 PQ
Three Rivers
89A300

Rod Birdsall arrived but the equipment had a breakdown enroute It wasn't repaired in time to move this day.

Aug 30/90

The spreader didn't arrive until 6·30 pm so all of the work was scheduled for Friday August 31. We planned to retake the emulsion samples (3 gallons to SHRP and 2 gallons to TTI) because it was now a different emulsion The spreader moved into Quebec without an over width permit and a substantial fine was paid.

Aug 31/90

The test sites were laid without any difficulties. At last the emulsion seemed to be OK. No brooming was carried out because Butch didn't want to remove the partially embedded aggregate. The district engineer came out later in the afternoon and said he would broom the next day if necessary. The road was opened to traffic without speed control at 5·00 pm. Mark Stinson left for Buffalo.

It should be noted that.

- the province brought their overlay 89A310 almost to 0+00 of the slurry seal. We therefore covered up the overlay with the slurry seal for 80' at the start of the test site.

- the contractor ran out of slurry seal 4+75 of the test lane. It is suspected that Quebec DOT took away about 10 tons.

- the space for the transitions was about 154'

Sep 04/90
36B300
Cranberry Lake
Hwy. 3

We noted that the NY state had already placed their test sites. All their test sections started at 0+00 and ended at 7+00, thus allowing no transition at one end. Dave Bernard asked that all SHRP sections be constructed accordingly, although we had marked them out to provide equal transition at both sides. It was a lovely day and all of the work went smoothly

Sep. 06/90
36A300
Fort Anne
Hwy. 4

September 5 looked as if it might rain, so construction was postponed until today. All test sections went smoothly. It should be noted that crack seal trial lane including the center line had been cracked filled previously. Most of the cracks if they were visible were routed and sealed. This previous sealing had spread out up to 6" or more. Tom Wolschied came in the afternoon and Suit-Kote was well represented by Frank and Dan Suits, Rod Birdsall and Margaret the public relations officer who took a lot of video

(NY report that slurry seal was ravelled out in short lengths in the wheel track, likely because of a rutted pavement failing to cure out before being opened to traffic).

Sep 10&11/90 Hwy. 147 42A300 Lewisburg	We laid out the test sites and Dan Sheftick had taken the condition surveys last May so they did not have to be redone. The trial slurry seal and crack sealing went down smoothly but the chip seal did not set up too quickly. Traffic was allowed on the trial lane and the slurry and crack filling was carried out on the test lane. Butch decided that a new emulsion had to be obtained for the chip seal A new blade was inserted into the router and the crack widths are now generally a full 1½" and the depths average closer to ½"
Sep 11/90	A new emulsion was obtained and placed It was very foggy until 10 00 am. It was placed at 11 30 and open to traffic at 1 15 pm before everyone headed for Ocean City, MD It should be noted that rutting is very noticeable Dan had the skid tester check the skid resistance of the trial chip seal and it was OK.
Sep. 12/90 Hwy 90 24A300 Ocean City	The test sites were well laid out so we secured them and laid out the transition points It was foggy until 11:00 am, so the trial was not started until 12 00 noon. The rumble strips were covered up but John Scally said that they would be rerouted The reflectors were covered up with tape. This is perhaps the smoothest test site of all There would be a long wait now because the Virginia I-95 site can not be started until September 18 Mel Stott left to go home to Toronto.
Sep 17/90 Hwy I-95 51A300	Marked out and secured the test sites It was noted that the state had placed a micropatch on site 51A321 and started it at -0+06, there was a spot marked out presumably for the slurry seal from 0+10 to 5+10 I couldn't reach anyone in the State so I scrubbed it out and showed all of the SHRP sites with 100' transitions at the beginning and end. I did a condition survey the best I could with the heavy traffic and can report that there is very little change to the survey carried out 11/13/89
Sep. 18/90	It was a nice sunny day but cold and started with the trial lane at 11 00 am The test lane was going nicely until we came to the chip seal The emulsion was laid but the chipper was malfunctioning and it was stopped for eight minutes for adjustments Because what was chipped right from the beginning was not uniform, it had to be spread out before it was rolled Rolling finally started 46 minutes after the emulsion was placed and rolling continued for one hour and 34 minutes. It was readily observed that there was alot of loose chips but this road was opened to traffic with no speed control Chips were flying all over as well as the creation of alot of dust It was hoped that the traffic would stabilize the chip.

Sep 19/90 I inspected the 51A300 site and noted that·

- a windrow of chips had built up at the edge of the pavement on the test lane.
- quite a uniform scatter of chips was present throughout the full width of both shoulders.
- bare spots were present on the test lane Particularly a narrow strip on some of the inside lane were the chips were lost
- the performance of the trial lane was very good The chips on the trial shoulder was likely coming from the test lane.

It will be interesting to see if the chip will stay on the test lane.

Sep 20/90 Enroute to Buffalo, I inspected the this site and noted that:
Hwy 147
42A300
Lewisburg

- the chip seal in the trial lane was much darker throughout than the test lane with it being slightly darker under the wheel paths.
- the test lane was light colored and uniform throughout.
- rutting was still very obvious.
- the state chip seal section adjacent to the SHRP using darker and smaller aggregate was very good. Two streaks were present caused by the overlap

Mon Sep 10/90

Hwy. 47, Lewisburg SHRP 421605 SPS 3 42A300

The trial lane was completed as well as the slurry and crack filling of the test lane The chip emulsion was not setting up quickly so a new batch was ordered and placed on the test lane the next day, September 11 and it was OK The contractor inserted additional blades in the router and the width of the routing was a full 1½". The speedy moisture meter broke down so we guessed the moisture of the aggregate from here on in

Wed Sep 12/90

Hwy. 90, Ocean City SHRP 241634 SPS 3 24A300

This was the smoothest test of all The rumble strips will be rerouted and the tapes covering the reflectors will be found and removed. No brooming was done.

Tue Sep 18/90

Hwy. I-95, Petersburg SHRP 511023 SPS 3 51A300

This section could not have been done on Friday or Monday because of heavy traffic. Everything was going nicely until we came to the chip seal on the test lane. The chips were bunching up at the center and the spreader was stopped for eight minutes before continuing. The rolling was also stopped for 46 minutes to allow the contractor to level out the chips. When it was opened to traffic, there were alot of loose chips. It was being knocked about with traffic and a lot of dust was created. Doug Mahone from Virginia Council has all of this on video.

APPENDIX C

NEW YORK STATE EXPERIMENTS

o **Glen Falls, ST 4**

- Section 36A321. 'Ralumac' Micro-Surfacing, completed 8/30/90

  Area: 700' x 26' = 2,022 sq. yds.

  'Ralumac': Blend of select crushed aggregate with sophisticated chemical formulation of asphalt cement, cationic emulsifiers, adhesives, latex and water.

  Construction: Placed in two lifts with slurry seal equipment
  1. shimmed ruts 1/2" deep
  2. placed 12' wide x 3/8" thick, 28-30 lbs/sq. yd , using 7-10% emulsion, 67% asphalt cement

- Section 36A331. 'Band Aid' Crack Sealing, completed 6/01/90

  Quantity: Approximately 700 lin. ft

  Product: Bakelite 590-13A Hot-Poured Rubberized Asphalt Joint Sealer. Formulated with refined asphalts, synthetic rubber, and fillers to meet requirements of ASTM D3450 and D1190

  Construction. Sealant is heated in a double boiler which provides non-direct heat and constant agitation. Application temperature was 185°C (365°F). Sealant is applied hot to cracks by overfilling, squeegeed off in a 4" wide 'band-aid' strip

o **Cranberry Lake, ST 3**

- Section 36B331. NYS Maintenance Band Aid Crack Seal, completed 5/09/90

  Area: 1700'

  Bitumat: Conforms to ASTM D3405

  Construction. Sealant is heated in a double boiler

o **Cranberry Lake, ST 3**

- Section 36B351 — Polymer Modified Chip Seal. completed 8/23/90

Area. — 700' x 22' (mm 1257 to 1258+200')

CRS 2 Polymer Modified Emulsion

Test results 8/29/90	Penetration at 77°F = 162 % Residue = 65 25% % oil = 1 0% charge = positive

Aggregate source: Barrette, Norwood, N.Y. (R-7)
1st Dolomite. NYS Source = 7-IR
"High Friction Aggregate"

Gradation.

Sieve	% Passing	Comments
1/2"	100.0	Absorption = 0 5%
1/4"	49 0	Poorly sized and dirty
1/8"	2.4	Stone on small side
#80	0 7	(Blend of #1. #1A)
#200	0 5	

Design: CRS-2 Polymer (latex) Modified Emulsion with Butonal NS 117 from BASF. Laid at 0.40 gals/sq. yd. at temperature of 180°F Distributor speed 225 ft/min. Chips at 22 lbs/sq. yd.

Construction: Weather was 75°F, sunny and dry An 8 ton Pneumatic Tire Roller was used behind the Etnyre Chipspreader. There was no sweeping

o **Cranberry Lake, ST 3**

- Section 36B352: Polymer Modified Chip Seal, completed 8/23/90

Area: 700' x 22' mm ???? to ????)

CRS 2 Polymer Modified Emulsion: Same as used in 36B351

Aggregate Source: Same as used in 36B351

Gradation:

Sieve	% Passing	Comments
1/2"	100	
1/4"	91.8	#1A size
1/8"	27 1	As desired
#80	1.0	
#200	0 8	

Design. 0 28 gals/sq. yd CRS 2 Polymer Modified Emulsion at 180°F laid at speed of 350 ft/min Chips laid at 16 lbs/sq yd

Construction: Same as used in 36B351

o **Cranberry Lake, ST 3**

- Section 36B353 — Polymer Modified Chip Seal completed 8/23/90

  Area — 500' x 22' (mm ???? to ????)

  CRS 2 Polymer Modified Emulsion (Butonal and Emulcol) — Test results 8/29/90:
  Penetration at 77°F = 108
  % Residue = 65 25%
  % oil = 1 0%
  charge = positive

  The CRS 2 Emulsion was modified by
  1 Polymer modifier (Latex additive Butonal NS 117)
  2 Emulcol at the rate of 8 6 gals per 500 gals of CRS-2

  Aggregate — Same as was used in 36B351

  Design — 0 40 gals/sq yd CRS-2 Polymer Modified Emulsion Laid at 180°F, speed 225 ft/min. Chips spread at 22 lbs/ sq yd

  Construction — Same as 36B351

- Section 36B354 — Polymer Modified Chip Seal, completed 8/23/90

  Area — 500' x 22' (mm ???? to ????)

  Emulsion — CRS-2 modified with Butonal NS 117 but with Emulcol added at the rate of 7 8 gals per 330 gals CRS-2. Similar to section 36B353, same test results

  Aggregate — #1A Dolomite, same as used in section 36B352

  Design — 0 27 gas/ sq yd CRS-2 modified emulsion laid at 180°F, speed at 350 ft/min 1A Dolomite chips spread at 16 lbs/sq yd

  Construction — Same as 36B351

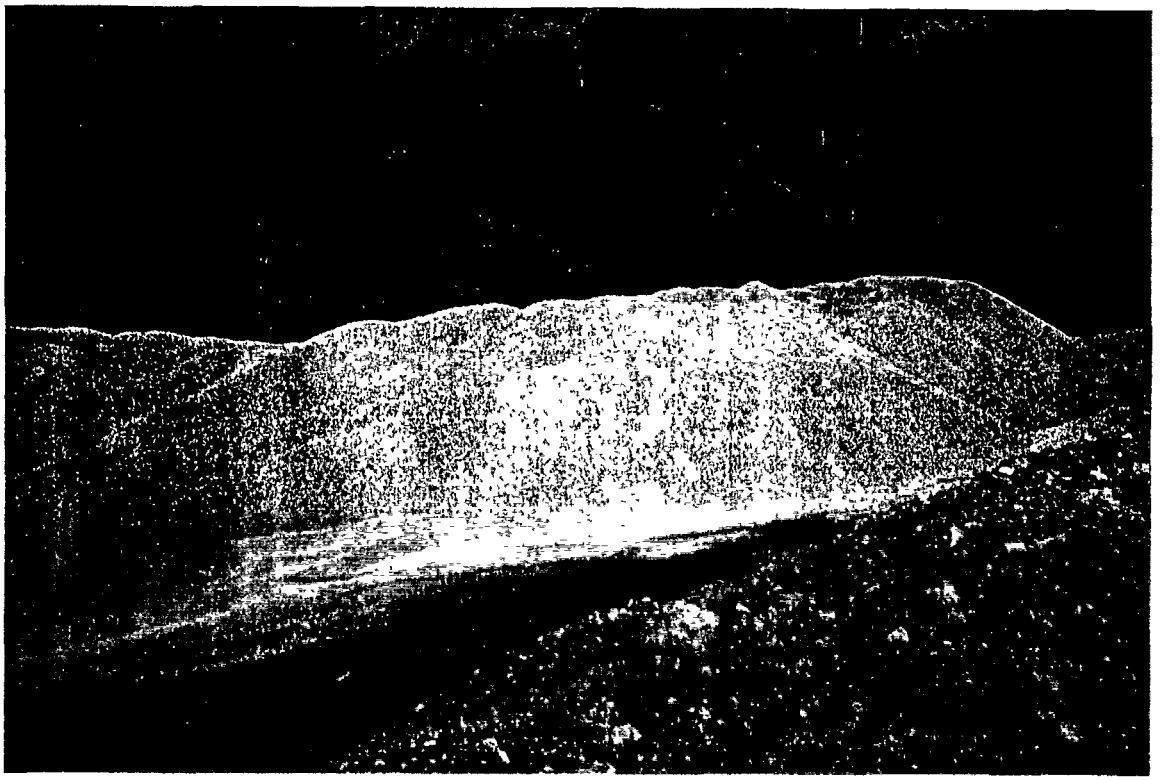


PHOTO 1 STOCK PILE – CHIP SEAL AGGREGATE
EASTERN ROCK PRODUCTS
LITTLE FALLS, NY AUG. 15/90

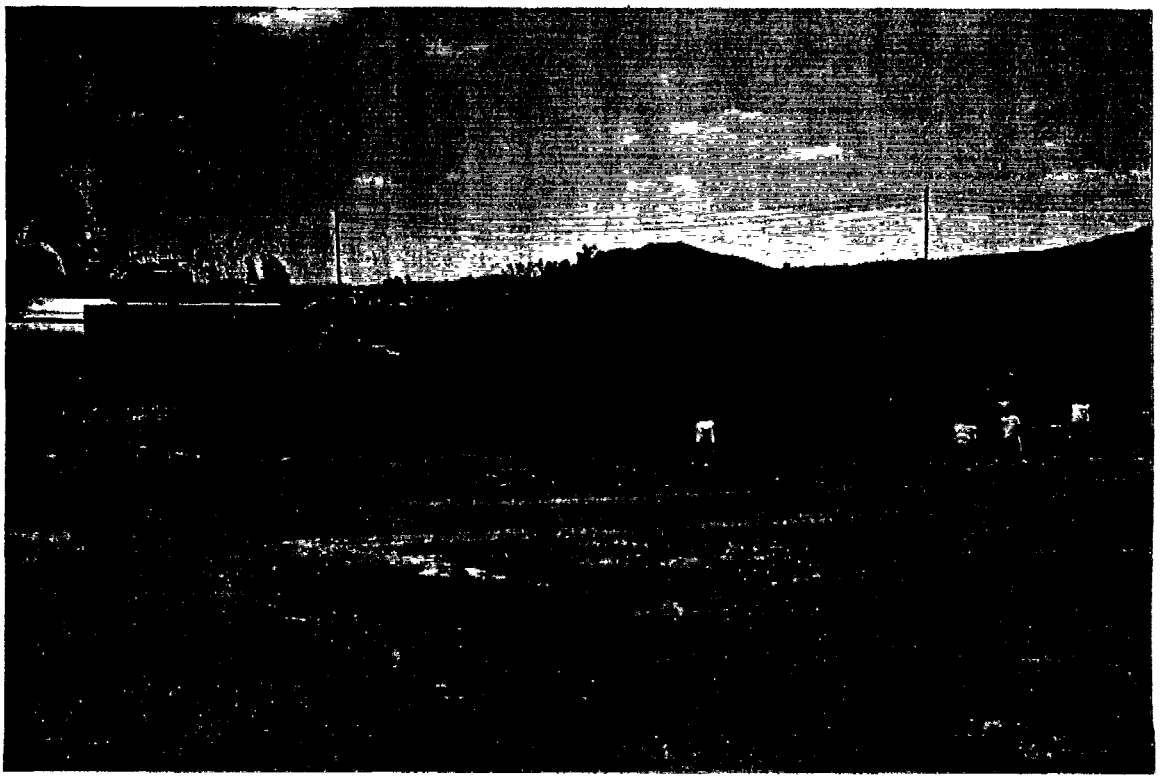


PHOTO 2 STOCK PILE – SLURRY AGGREGATE
GENERAL CRUSHED STONE
HONEOYE, NY AUG. 15/90

PHOTO 3
SLURRY SEAL MIXER WITHOUT SCREED DURING CALIBRATION

PHOTO 4
WEIGHING EMULSION DURING CALIBRATION

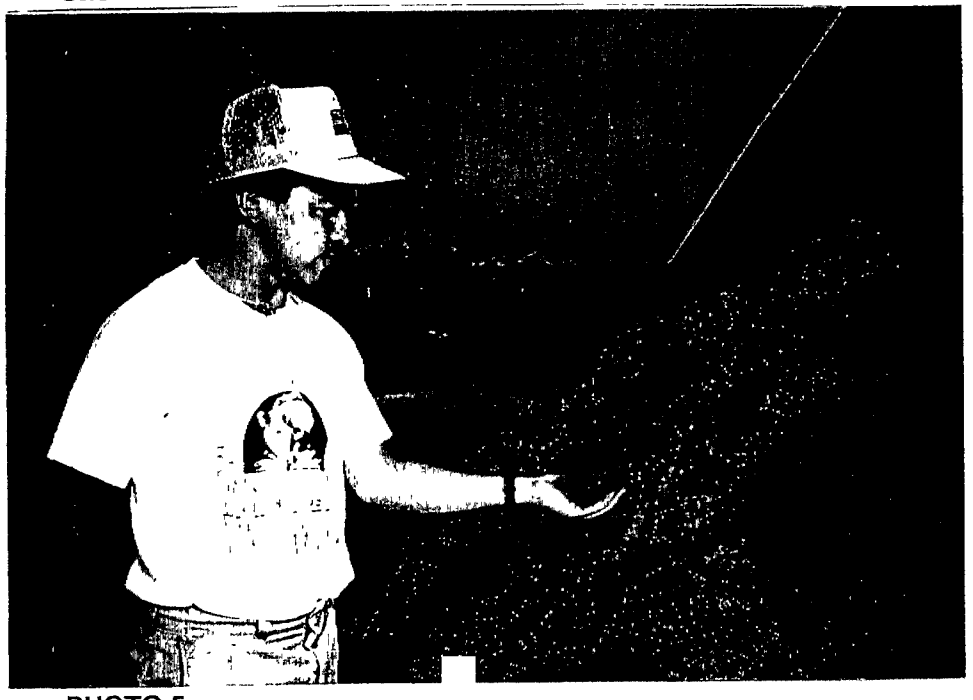


PHOTO 5
SLURRY SEAL AGGREGATE AT CALIBRATION SITE

PHOTO 6
WEIGHING HYDRATED LIME DURING CALIBRATION

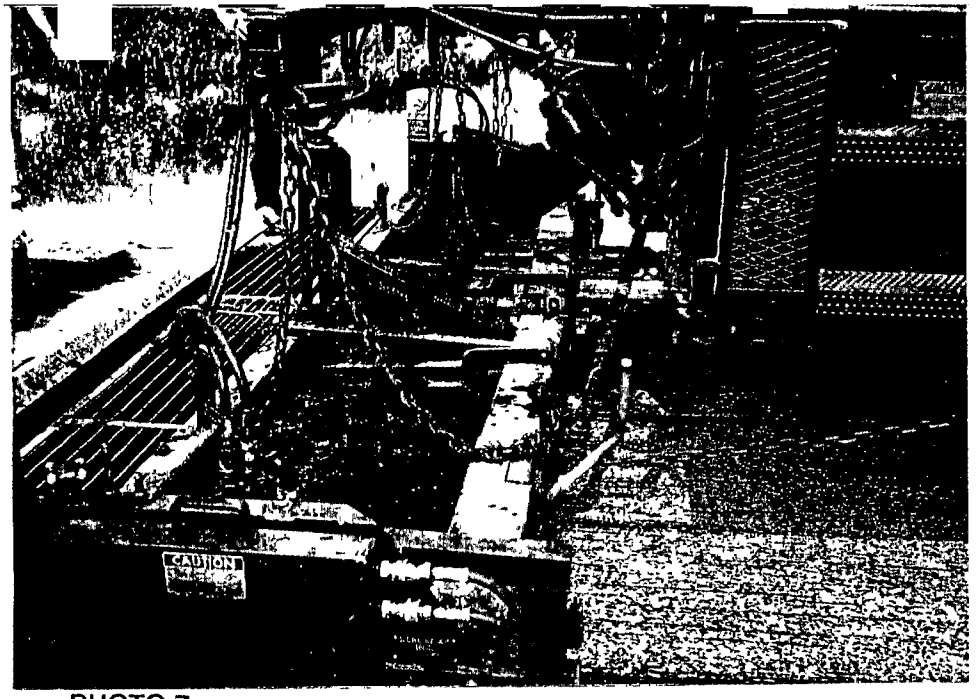


PHOTO 7
SLURRY SEAL SCREED IS FILLED DURING CALIBRATION TRIALS

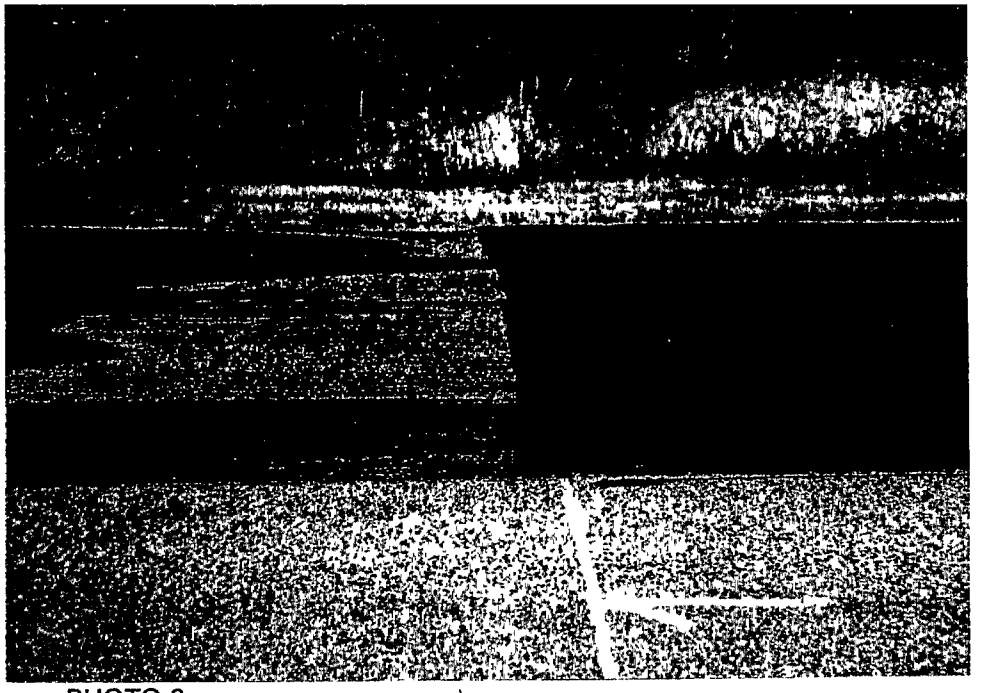


PHOTO 8
SLURRY SEAL TRIALS 1 AND 2

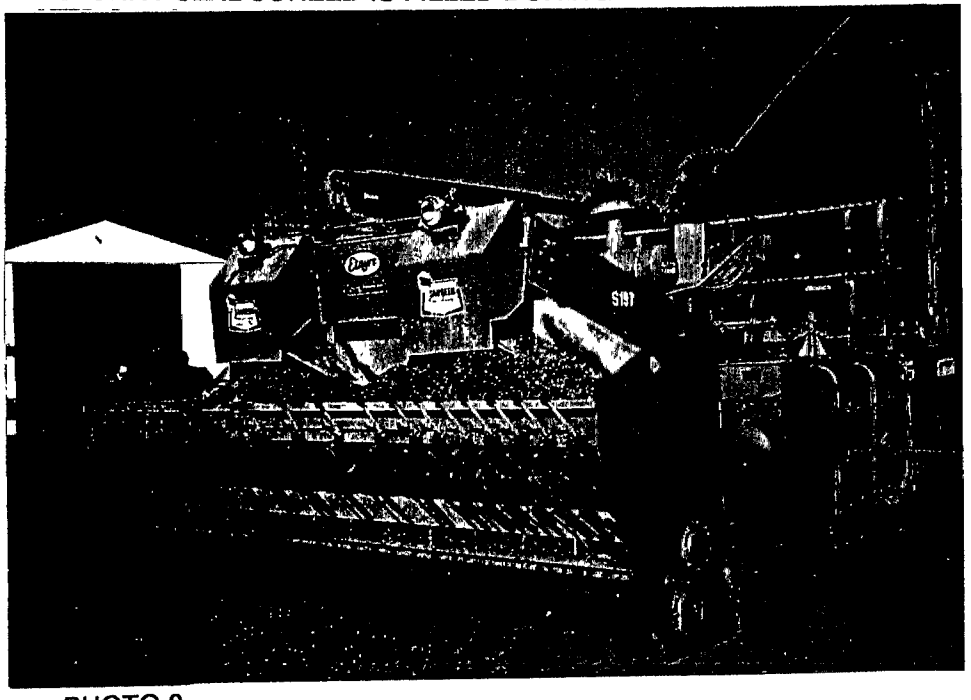


PHOTO 9
CHIP SPREADER DURING CALIBRATION

PHOTO 10

PHOTO 11

HWY. 11 BRACEBRIDGE, 87B350 AUG. 21/90
THE TRIAL LANE CHIP SEAL DID NOT SET UP PROPERLY. IT WAS BLADED OFF,
AND FOR SAFETY REASONS SAND WAS ADDED, COMPACTED AND THEN BLADED OFF

PHOTO 12

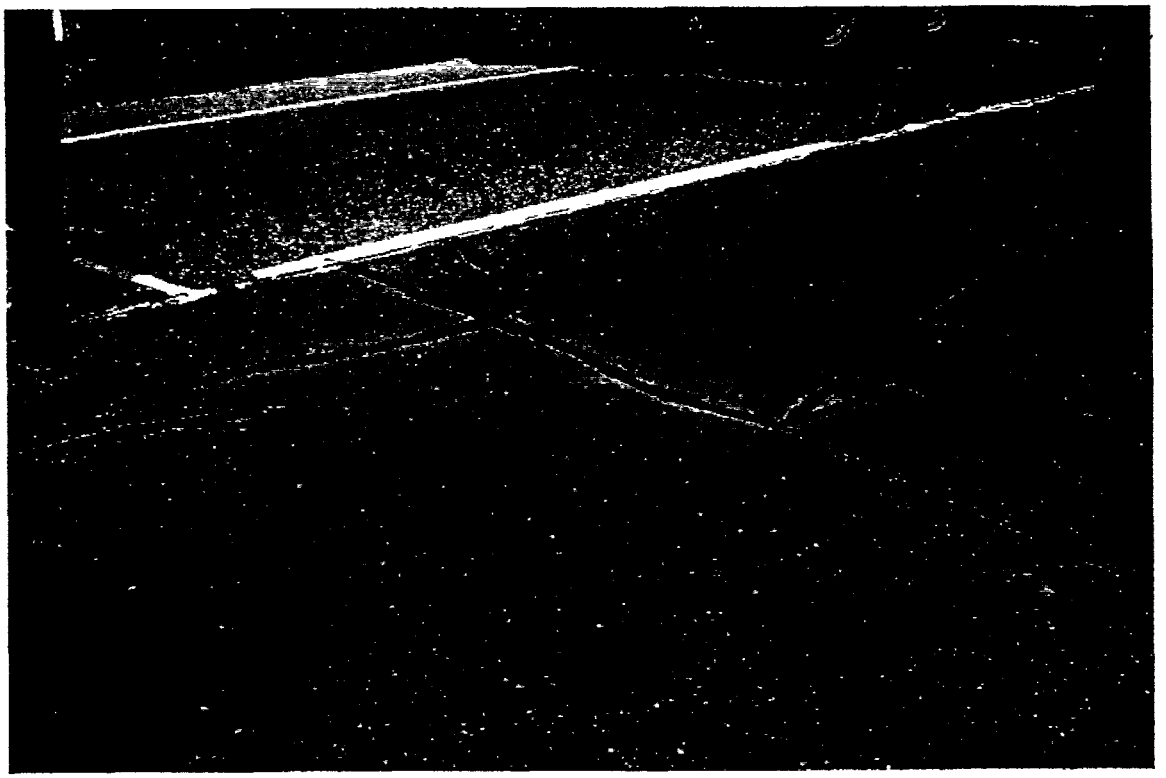


PHOTO 13

HWY. 11 BRACEBRIDGE 87B330 (PHOTOS 12 THROUGH 16)
SHOWS COMPLETE OPERATIONS – ROUTED, CRACK FILLING,
PLACING TOILETTISSUE AND OVERALL VIEWS

PHOTO 14

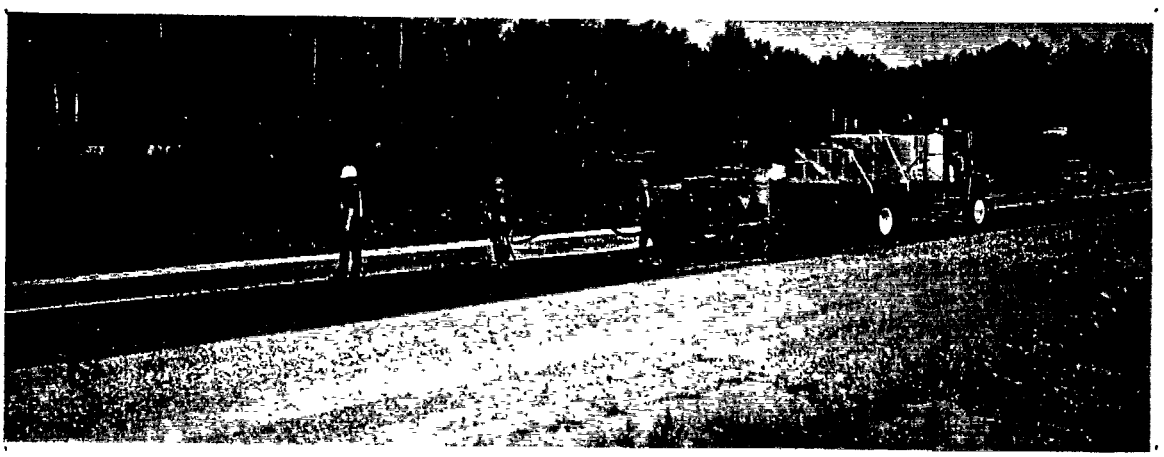
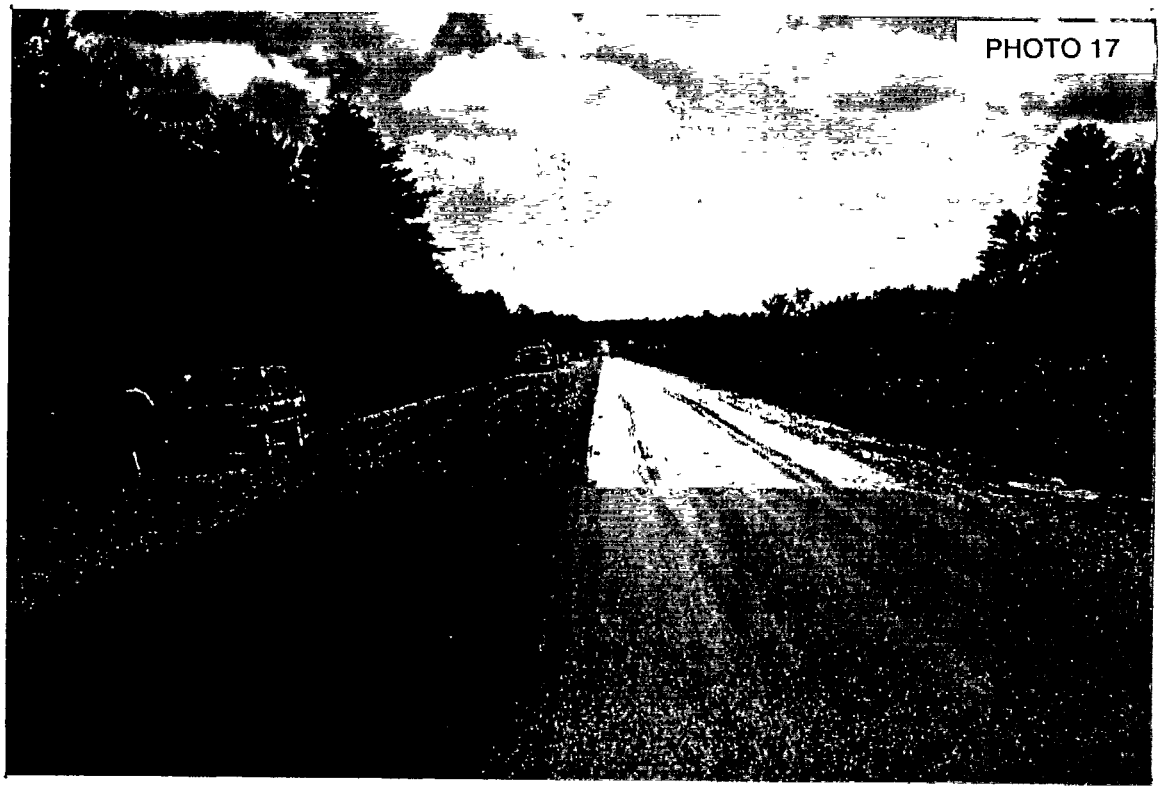
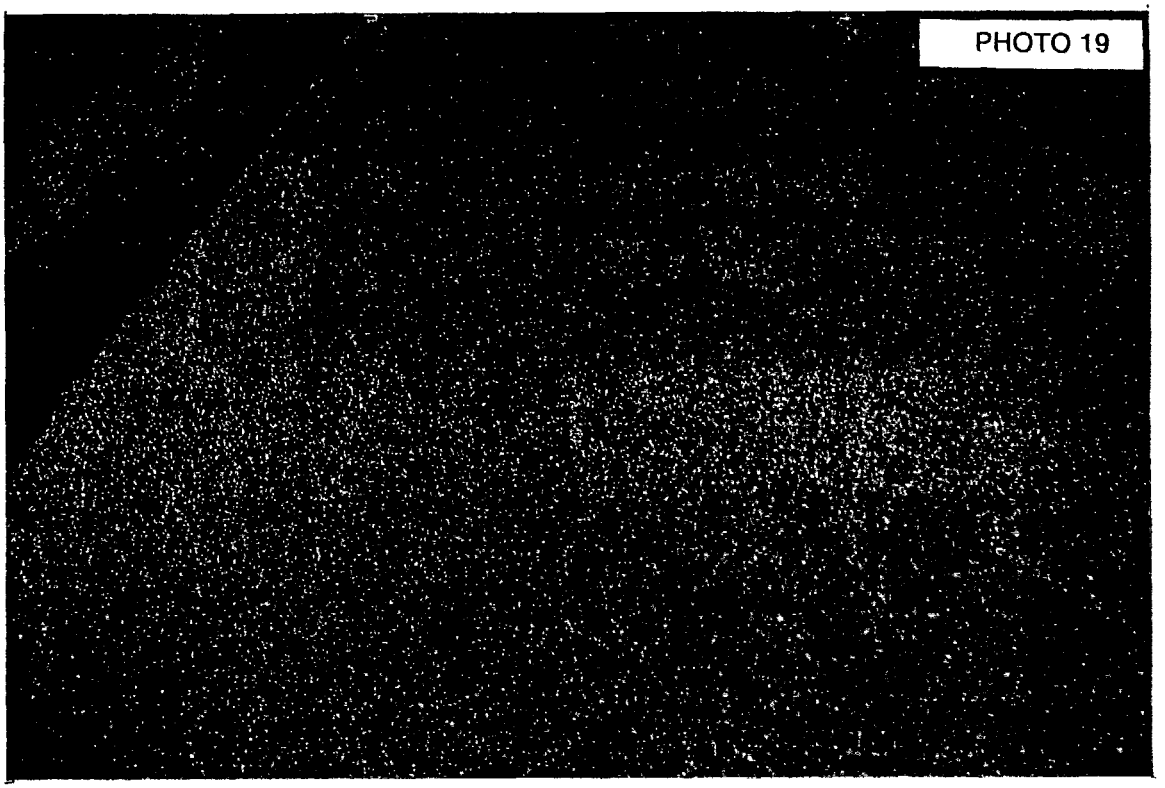


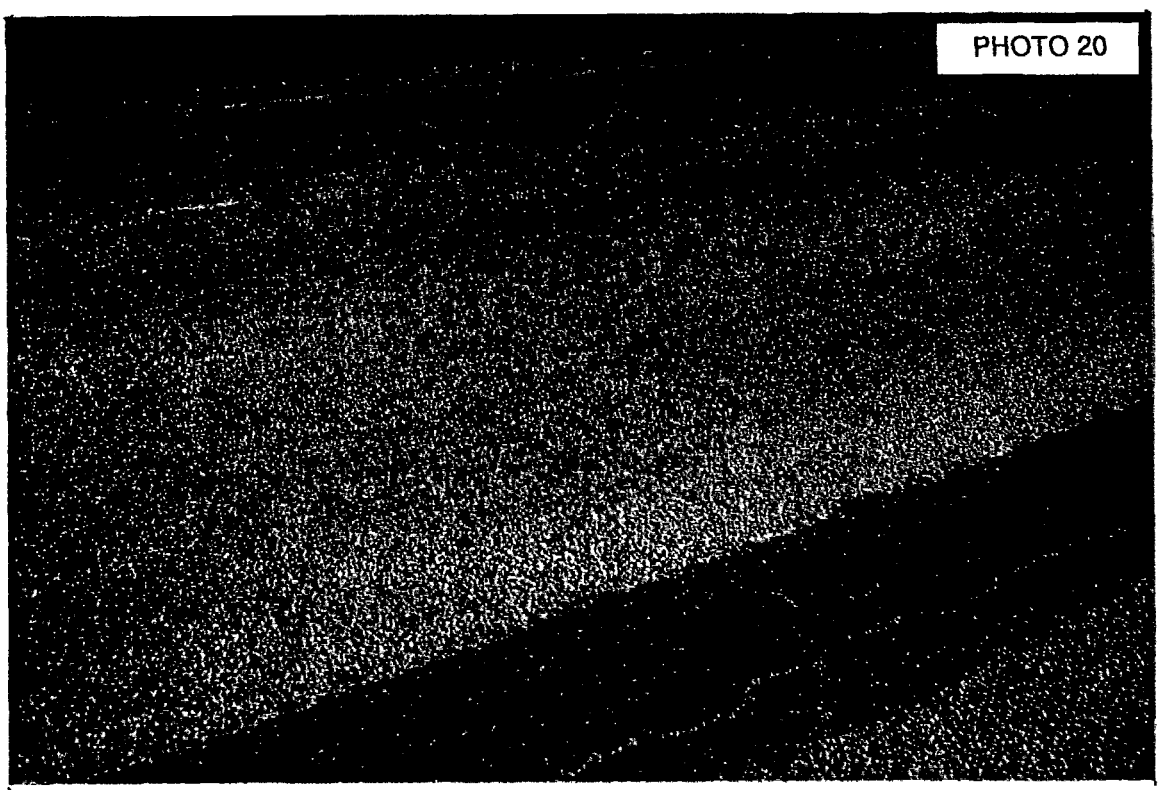
PHOTO 15

PHOTO 16

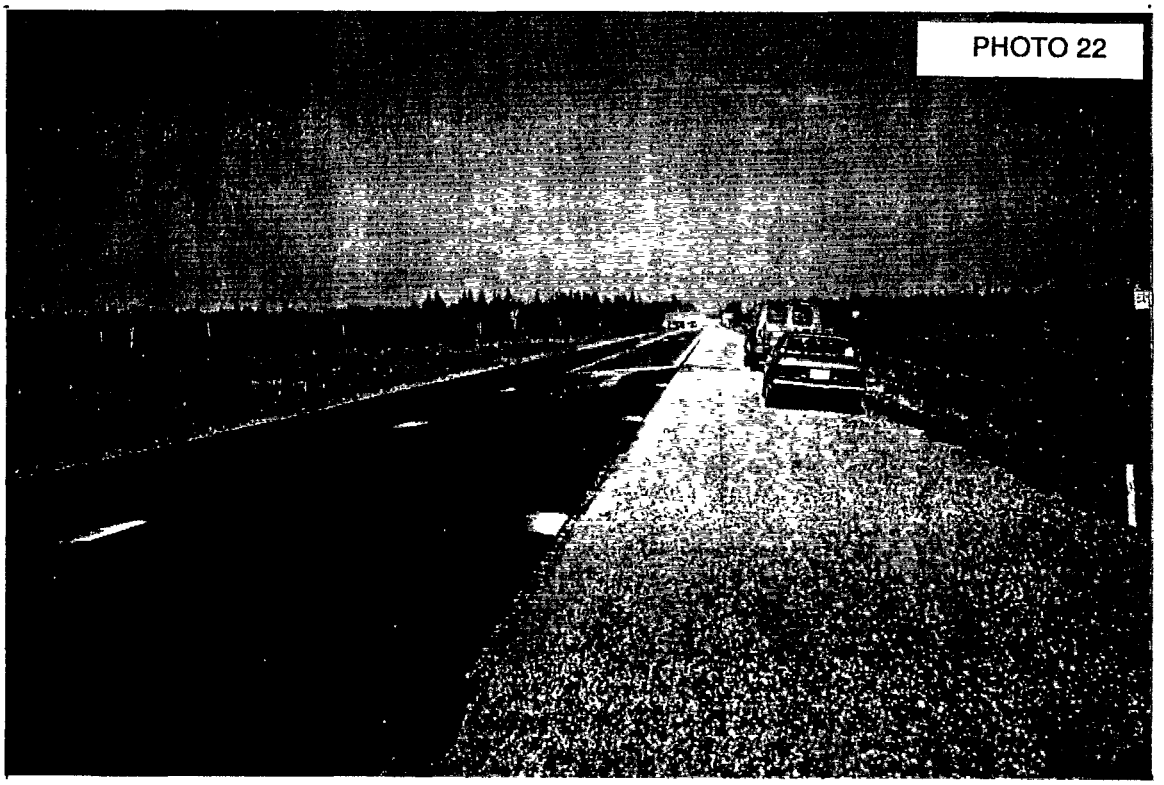


HWY. 11 BRACEBRIDGE, ONTARIO AUG. 22/90 (PHOTOS 17, 18)
ONTARIO HAD PROBLEMS WITH THEIR EXPERIMENTAL TEST SITE (MICRO SURFACING) AND COVERED IT UP WITH THEIR CHIP SEAL (SMALLER AGGREGATE) IT ADJOINED THE SHRP CHIP SEAL SITE



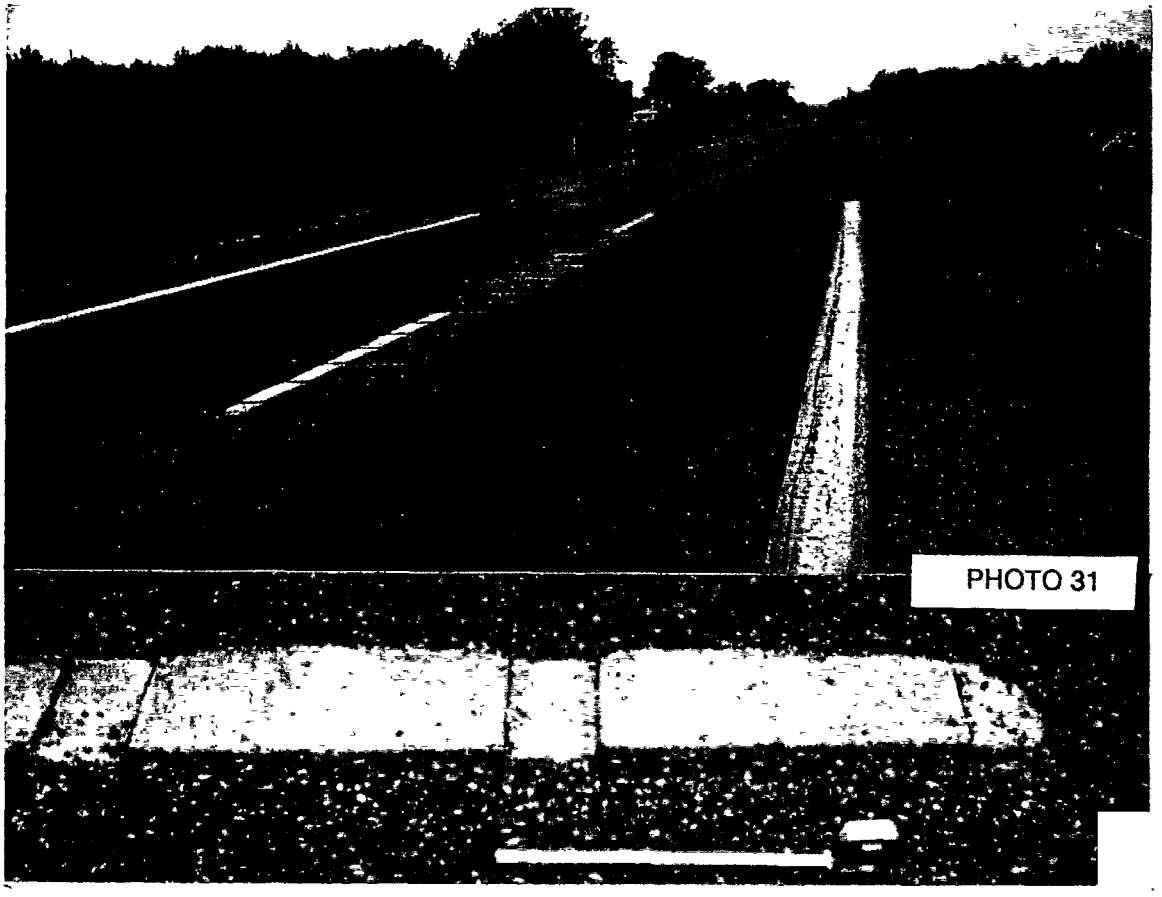


HWY. 400 MOONSTONE, 87A350 AUG. 23/90 (PHOTOS 19, 20)
THIS CHIP SEAL WAS PLACED ON AUG. 20/90. NOTE THAT IT IS DARKER UNDER THE WHEEL TRACKS AND THERE IS LACK OF AGGREGATE COVERAGE IN SPOTS BECAUSE OF RUTTING (PROBABLY). CRACKS SHOW THROUGH TO THE SURFACE

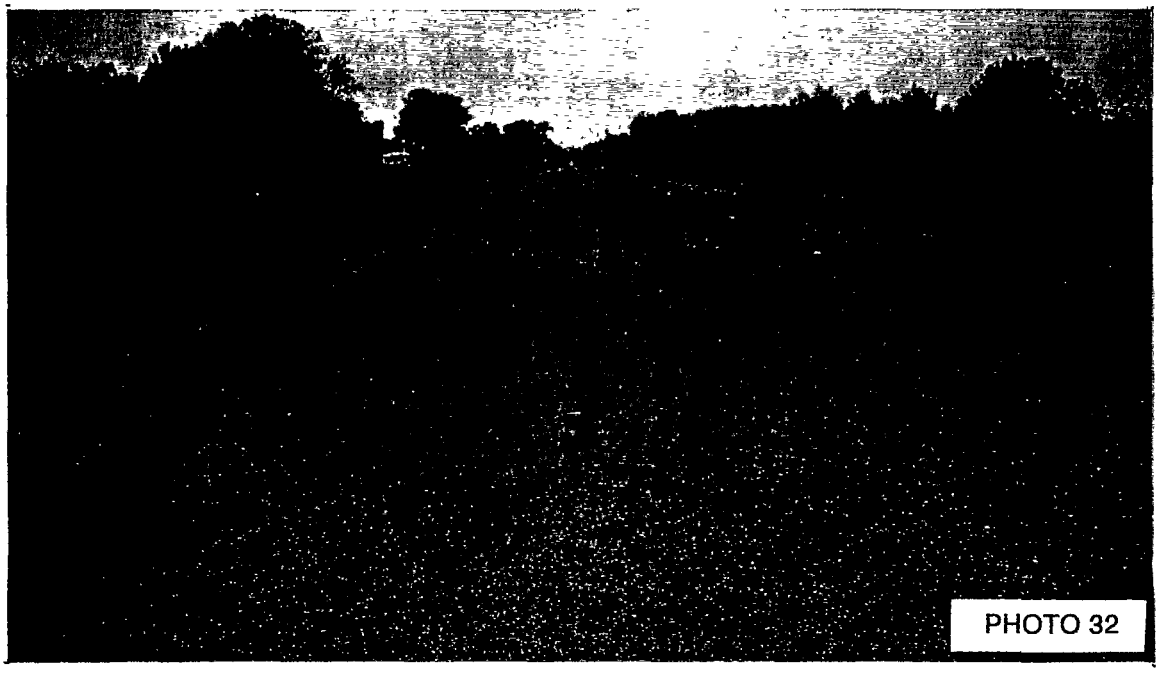


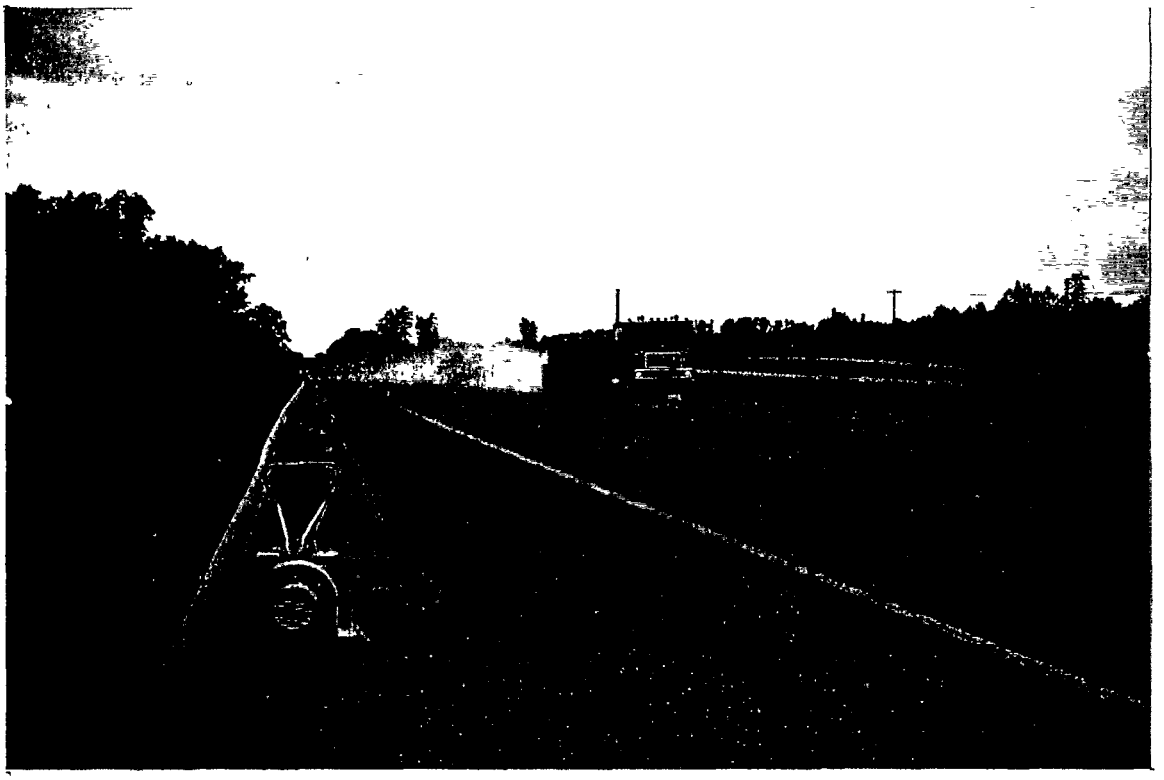
HWY. 40 THREE RIVERS, QUEBEC 89A350 AUG. 31/90 (PHOTOS 21, 22)

1. CHIP SEAL JOB WAS CONSIDERED GOOD – BUT NOTE THE DARKENING OF THE WHEEL PATHS IN THE TRIAL LANE
2. SLURRY SEAL WAS GOOD BUT NOW OUT OF AGGREGATE AT 4+75 OF THE TEST LANE



HWY. 90 OCEAN CITY, MD 24A350 SEP. 12/90 (PHOTOS 31, 32)
PROBABLY THE SMOOTHEST SITE OF ALL. CHIP SEAL WAS PLACED DIRECTLY OVER RUMBLE STRIPS WHICH WILL BE ROUTED. EVIDENCE OF RUMBLE STRIPS IN CHIP SEAL TREATMENT





HWY. I–95 PETERSBURG, VA 51A350 SEP. 18/90 (PHOTO 33)
THIS PHOTO IS THE RESULT OF EXCESSIVE CHIP AND LATE ROLLING

PHOTO 34
THE REST OF THESE PHOTOS WERE TAKEN THE NEXT DAY ON SEP. 19/90 – STILL DUSTY

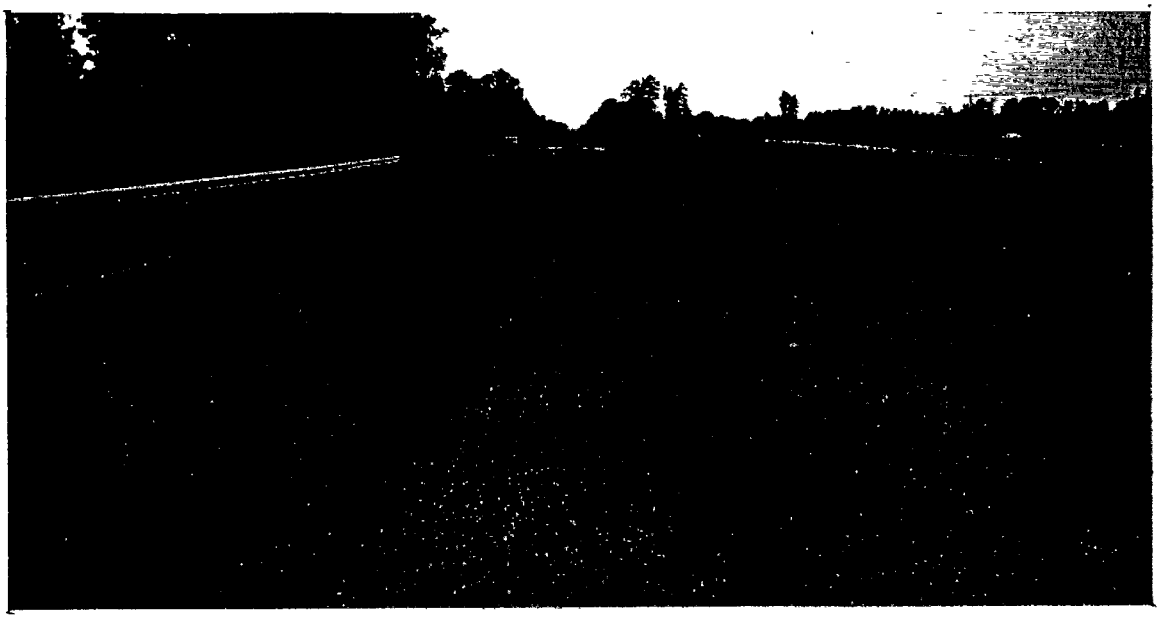
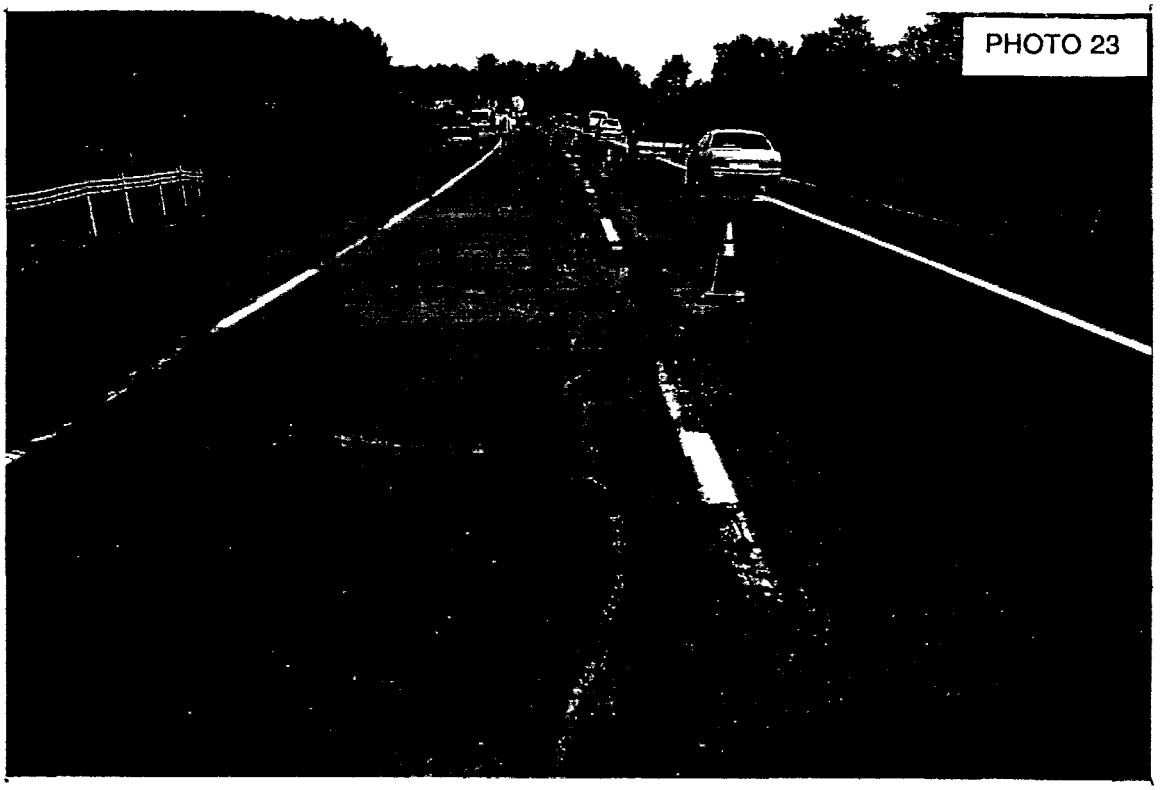
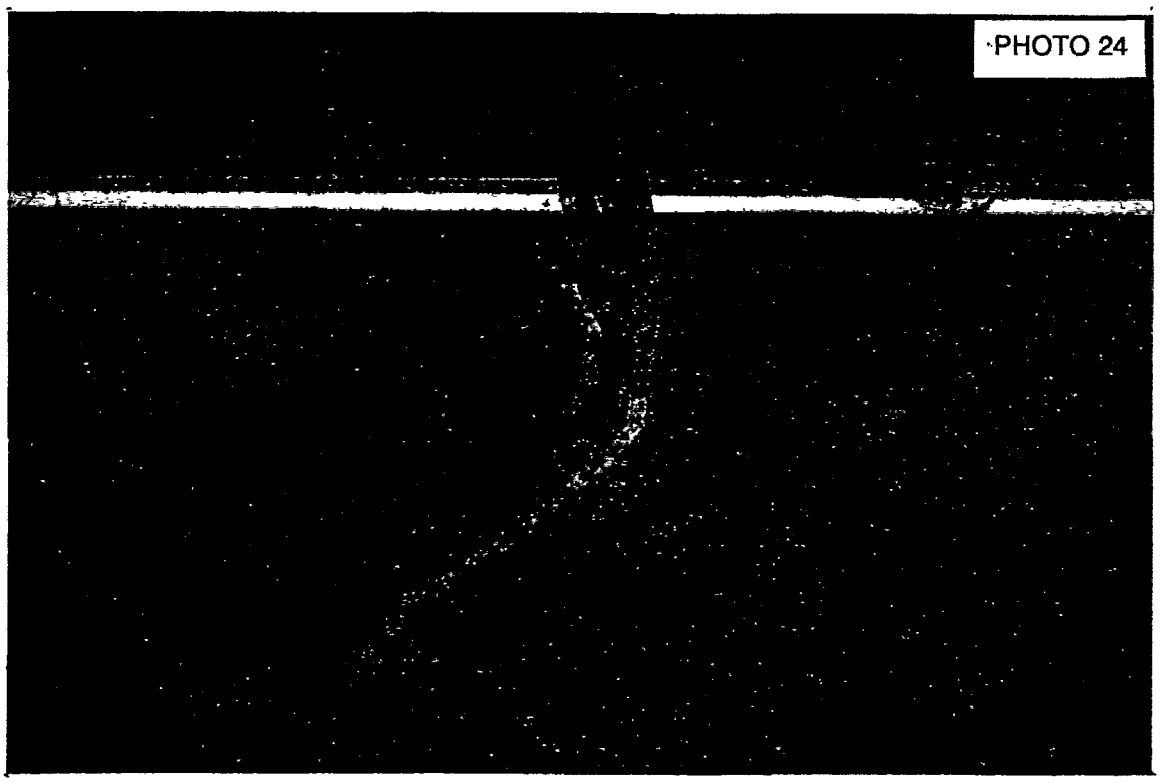


PHOTO 35
STREAKING AND LOSS OF AGGREGATE
TEST LANE

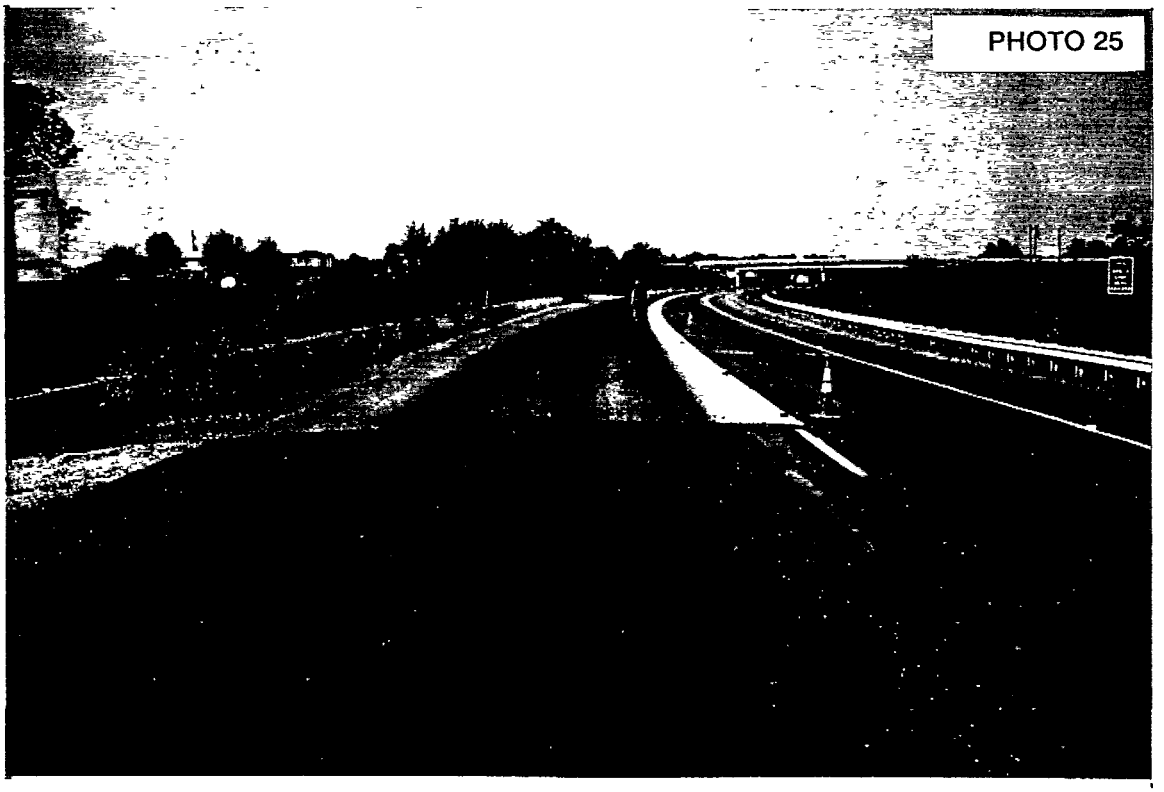
PHOTO 36
AN AREA WITH LOSS OF AGGREGATE
TEST LANE

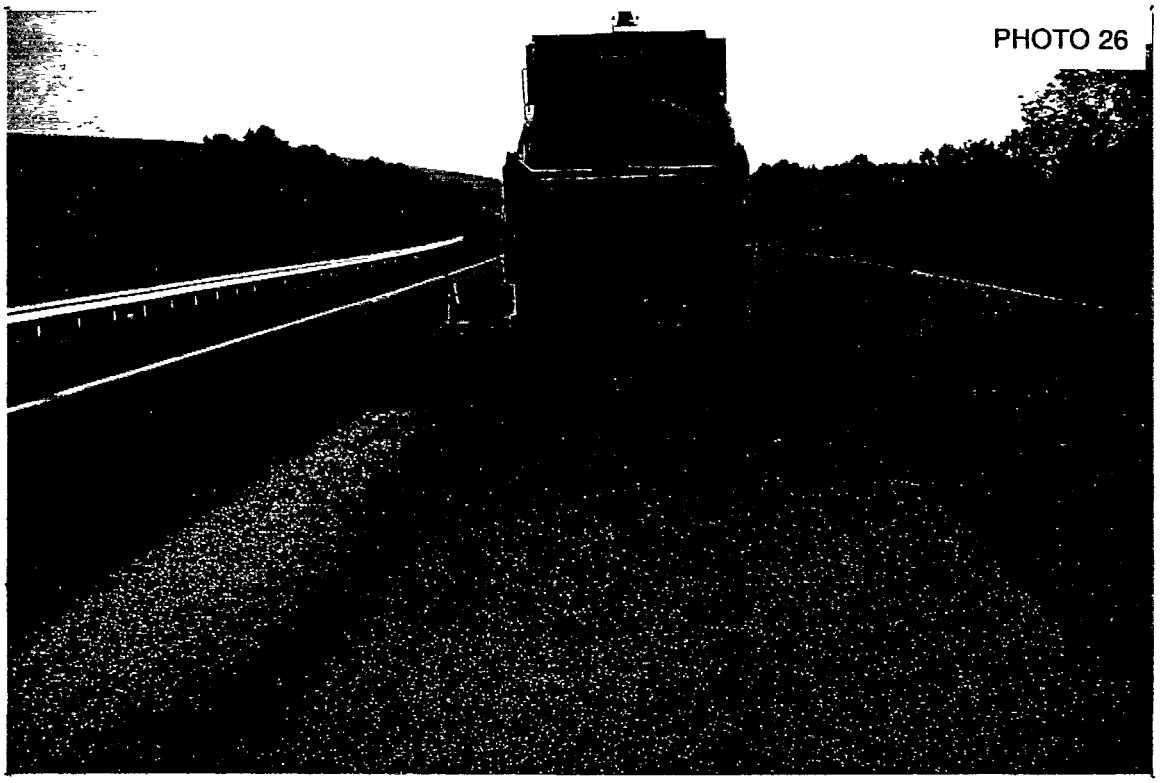
PHOTO 37
TRIAL LANE IN EXCELLENT CONDITION



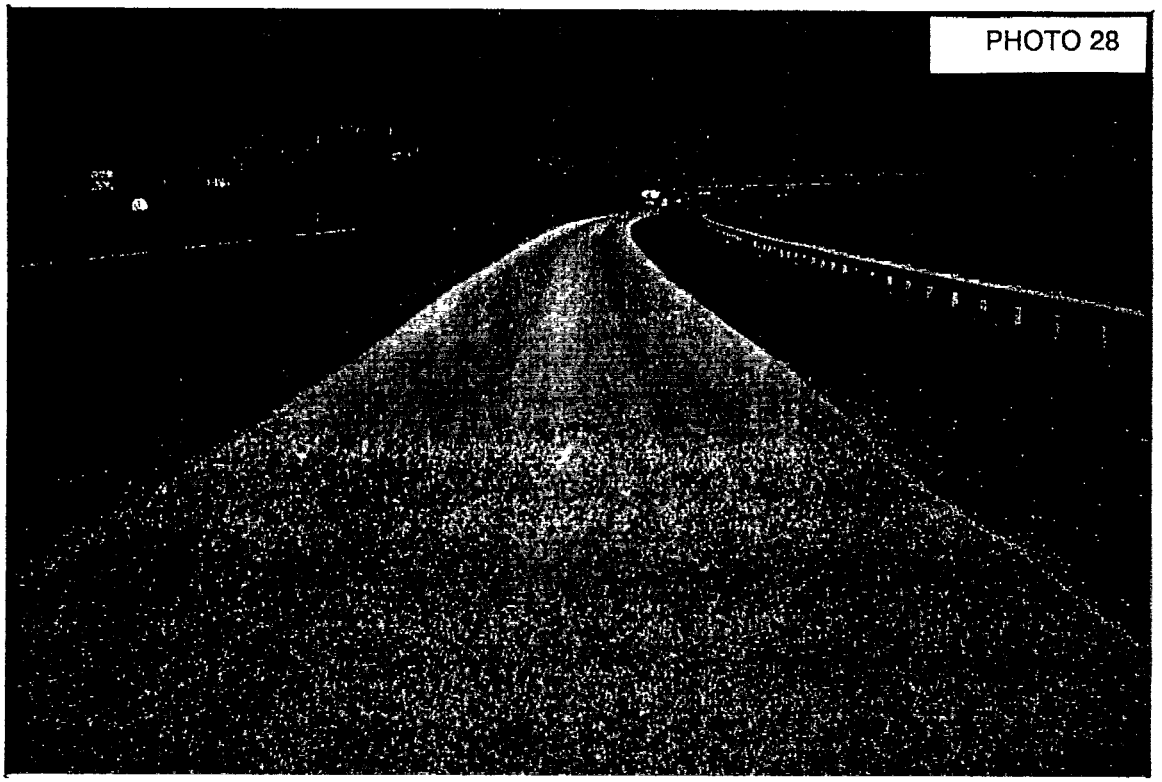


HWY. 4 FORT ANN 36A330 SEP. 06/90 (PHOTOS 23, 24)
TRIAL LANE AND CENTER LINE HAD BEEN PREVIOUSLY CRACK FILLED WITH A SQUEEGEE TYPE EQUIPMENT. CRACK FILLER IS WELL SPREAD OUT – ALL CRACKS VISIBLE WERE ROUTED AND SEALED

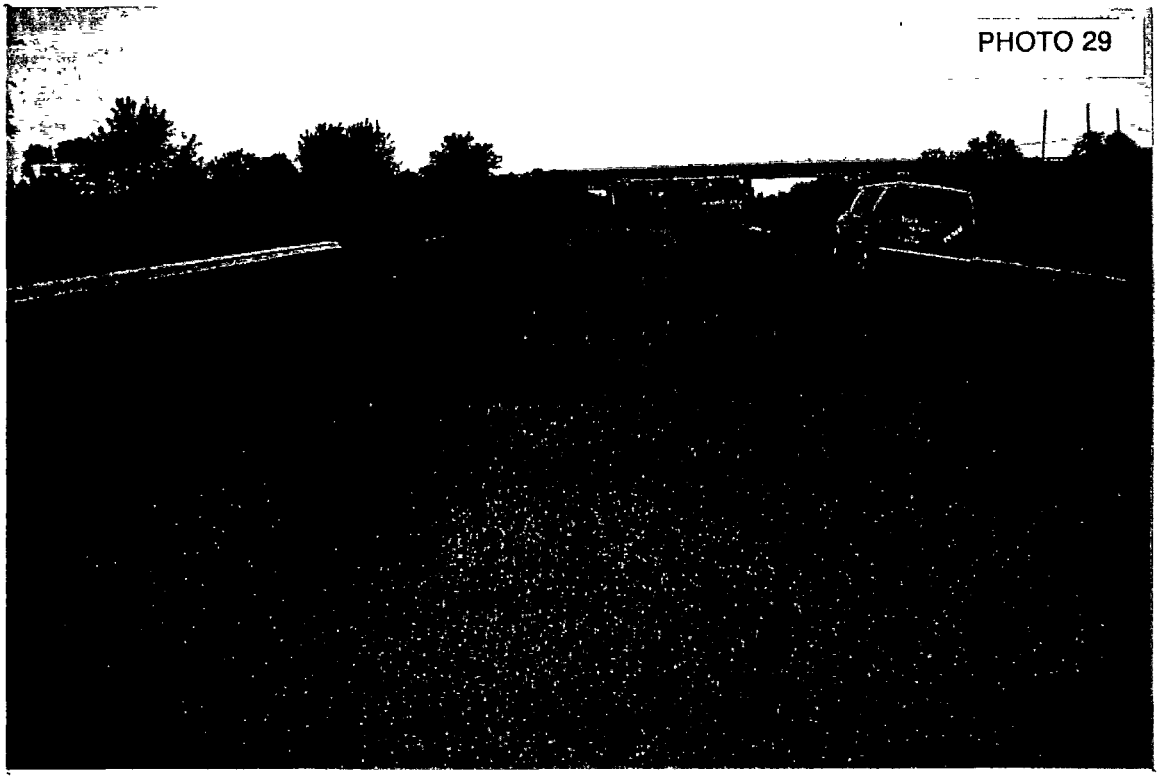




HWY. 147 LEWISBURG, PA 42A350 SEP. 10/90 (PHOTOS 25, 26)
TRIAL LANE WAS SOFT AND DARKENING UNDER WHEEL PATHS.
PLACED SAND TO STOP IT FROM TRACKING



HWY. 147 LEWISBURG, PA 42A350 SEP. 11/90 (PHOTOS 27, 28)
THE TEST LANE WAS PLACED ONE DAY AFTER THE TRIAL LANE. NOTE THE CONTRAST IN COLOR (A NEW EMULSION)



HWY. 147 LEWISBURG, PA 42A350 SEP. 20/90 (PHOTOS 29, 30)
NINE DAYS AFTER TREATMENT, THERE IS STILL A CONTRAST IN COLOR. THE PHOTO BELOW IS THE STATE CHIP SEAL. IT IS DARKER AGGREGATE AND LAID IN THREE PASSES, WHICH IS THE REASON FOR THE TWO STREAKS