Rehabilitation of a Jointed Portland Cement Concrete Pavement on I–35 (Southbound) in Kay County, Oklahoma

JEROME F. DALEIDEN, DAVID A. OOTEN, AND MARK D. SARGENT

As part of the SHRP Long Term Pavement Performance (LTPP) Studies, numerous projects are being constructed to study various design strategies for new and rehabilitated pavements. These studies are referred to as Specific Pavement Studies (SPS). One SPS rehabilitation study specifically targets the rehabilitation of jointed concrete pavements (SPS–6). Specific designs have been prepared and implemented to incorporate seven of the more common concrete pavement rehabilitation strategies, along with a control section. Sixteen such projects are to be constructed around the country. Included in these treatments are asphalt overlays of the jointed concrete both with and without cracking and seating, as well as various other features in an attempt to enhance the performance of these rehabilitation strategies. One of the 16 planned projects was constructed on I–35 in Kay County, Oklahoma, in the fall of 1992. The existing project featured a 0.2-m (9-in.) jointed reinforced concrete pavement, with a 0.1-m (4-in.) sand cushion, over 0.2 m (8 in.) of soil aggregate subbase on a silty clay subgrade. As part of the SHRP LTPP program, performance data have been collected on each test section before and after construction. Although the experimental sections in Oklahoma have not been in service long, distinctions in performance are already apparent. Performance of the sections in Oklahoma appear to indicate that a 0.1-m (4-in.) asphalt overlay of jointed concrete pavement (JCP) can be expected to exhibit reflection cracking within 2 years under typical interstate traffic. Reflective cracking can be controlled to some extent using sawing and sealing of the asphalt cement overlay and can be controlled even more effectively using rubblizing. One must consider, however, that the performance referenced herein may be unique to environment, subgrade type, and traffic levels, to name but a few.

INTRODUCTION

As part of the SHRP Long Term Pavement Performance (LTPP) Studies, sections of highway are being selected to apply very specific treatments to study various facets of construction (both new and rehabilitation). These projects are referred to as Specific Pavement Studies (SPS). One category, SPS–6, deals with the rehabilitation of jointed concrete pavement (JCP). In 1992, one SPS–6 project was constructed on I–35 in Kay County, Oklahoma.

SPS–6 General Experiment Design

The specific products anticipated from the SPS–6 experiment are included in Table 1 (*1*). In general, the experiment is intended to evaluate some of the more common concrete rehabilitation techniques currently used by state highway agencies (SHAs). Included in this evaluation are the condition of the pavement before overlay, the loading conditions the section is exposed to (including both environment and traffic), and the various treatment applications. The standard SPS–6 experiment design consists of eight test sections, as shown in Table 2 (*1*). The test sections include

- Two 305-m (1,000-ft) long concrete pavement restoration sections, one with retrofitted edgedrains and one without;
- Two break and seat test sections, one receiving a 0.1-m (4-in.) asphalt overlay and the other a 0.2-m (8-in.) asphalt overlay;
- Three sections with a 0.1-m (4-in.) asphalt overlay placed on the existing JCP (one with retrofitted edgedrains, one for which joints were sawed in the asphalt overlay directly above the existing concrete joints and then resealed with hot-poured rubber asphalt, and one conventional overlay).

As part of the experiment design, a control section, to which no treatments were applied was also established to provide for comparisons with the other test sections. Three of the eight joints in the control section did, however, receive some patchwork to eliminate existing safety hazards.

Specific Experiment Design for I–35

The test sections were part of Federal Aid Project Number IR–35–4(148)214 for rehabilitation of pavement in the southbound lanes of I–35 in Kay County, Oklahoma. This project began approximately 25.75 km (16 mi) south of the Kansas state line and extended south by some 6.5 km (4 mi). Traffic levels on this segment of I–35 were reported at 10,000 vehicles annual average daily traffic (AADT), consisting of approximately 33 percent trucks. 540,000 ESALs were estimated per year in the study. Plans for this project were prepared by the Oklahoma Department of Transportation (DOT) Rural Design Division. A layout of these test sections is provided in Figure 1. It should be noted that the concrete pavement restoration test sections were intended to include full-depth patching, partial-depth patching, pressure grouting, load transfer restoration, diamond grinding, and joint resealing. Evaluations of this project during the plan preparation phase, however, established that partial-depth patching, load transfer restoration, and pressure grouting were not needed. Fault measurements were typically less than 3 mm (0.1 in.), and pavement deflection readings indicated load transfer efficiency at the joints in excess of 90 percent. Simi-

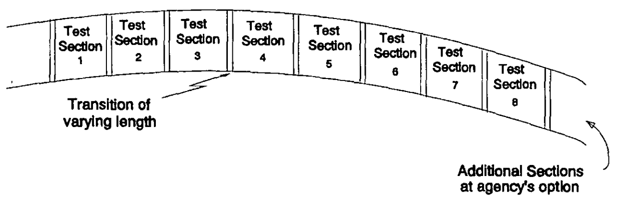
J. F. Daleiden and M. D. Sargent, Brent Rauhut Engineering, 8240 Mopac, Suite 220, Austin, Tex. 78759. D. A. Ooten, Oklahoma Department of Transportation, 200 N.E. 21st Street, Oklahoma City, Okla. 73105–3204.

TABLE 1 Key Products of SPS–6

Product Nº.	Description
1	Comparisons and development of empirical prediction models for performance of rehabilitated JPC and JRC pavements with different methods of surface preparation, with and without AC overlays, with sawed and sealed joints, with crack/break and seat preparation and different AC overlay thicknesses, and with and without retrofitted drainage.
2	Evaluation and field verification of AASHTO Guide design procedures for rehabilitation of existing JPC and JRC pavements with and without AC overlay, and other analytical overlay design procedures for JPC and JRC pavements.
3	Determination of appropriate timing to rehabilitate JPC and JRC pavements in relation to existing conditions and type of rehabilitation procedures.
4	Development of procedures to verify and update the pavement management and life-cycle cost concepts in the AASHTO Guide using the performance prediction models developed for rehabilitated JPC and JRC pavements.
5	Development of a comprehensive data base on the performance of rehabilitated jointed concrete pavements for use by state and provincial engineers and other researchers.

larly, condition surveys, delamination evaluations at the joints, and coring performed during material sampling and field testing failed to identify areas where partial depth patches would be necessary. Hence, the concrete pavement restoration for the test sections on I–35 was limited to full-depth patching, diamond grinding, and joint resealing with low modulus silicone.

TABLE 2 SPS–6 Test Sections



SPS-6 Section	JC PAVEMENT PREPARATION	OTHER TREATMENTS	OVERLAY THICKNESS
1	Routine Maintenance		0
2	Minimum Restoration		0
3	Minimum Restoration		0.1 m (4 in.)
4	Minimum Restoration	Saw and Seal Joints in AC	0.1 m (4 in.)
5	Maximum Restoration(CPR)		0
6	Maximum Restoration(CPR)		0.1 m (4 in.)
7	Crack/Break and Seat		0.1 m (4 in.)
8	Crack/Break and Seat		0.2 m (8 in.)

MONITORING

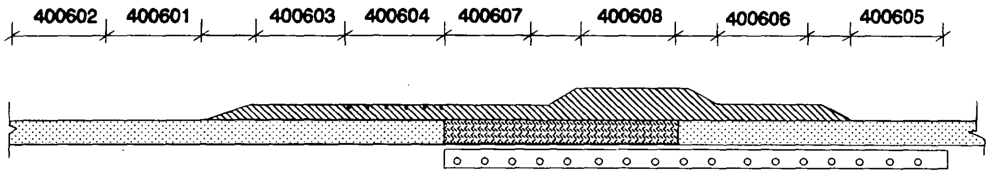
Extensive observations and testing are conducted on all SPS–6 test sections to establish the impact of these rehabilitation treatments on performance. This includes periodic deflection testing, profile measurements, traffic monitoring, and distress surveys.

Pavement Surface Distress

Before construction, those highway segments slated for rehabilitation were filmed in October 1991 by a PASCO ROADRECON unit, and manual (visual) distress surveys were conducted in October 1991 and July 1992. The pavement surface before construction exhibited some map cracking; however, coring and delamination tests did not identify any problem areas of potential delamination. Faulting at the joints was fairly minimal [less than 3 mm (0.1 in.) on average]. Only one corner break existed. A high severity corner break was identified on the first joint (12 m into the section) for Section 400604. Two (on Section 400604) to five (on Section 400601) joints were spalled per section, ranging from a total of 1 m of spalling (on Section 400604) to almost 6 m (on Section 400608). The spalling was predominantly low severity (30 percent); however, some moderate and high severity spalls were noted (6 percent each). Forty-eight percent of the joints exhibited no spalling. After construction, the test sections were again filmed by the PASCO ROADRECON unit in March 1993, and manual distress data were collected in November 1992, October 1993, and March 1994.

Surface Profile

The surface profile was measured by both rod and level surveys and a profilometer. Rod and level measurements were taken immediately before construction, and this project was also profiled using



Test Section ID	Treatment
400601	Routine Maintenance
400602	Minimum Restoration
400603	Minimum Restoration, 0.1 m (4 in.)Overlay
400604	Minimum Restoration, 0.1 m (4 in.) Overlay, Saw & Seal Joints
400605	Maximum Restoration(CPR)
400606	Maximum Restoration(CPR), 0.1 m (4 in.) Overlay
400607	Crack, Break and seat, 0.1 m (4 in.) Overlay
400608	Crack, Break and seat, 0.2 m (8 in.) Overlay

Rubbelized Concrete
Edge Drain Location
Saw and Seal Test Section
Jointed Plain Concrete
Asphalt Concrete Overlay

FIGURE 1 4006XX typical section and site layout.

SHRP's high-speed profilometer in January 1992. The high-speed profilometer produces a longitudinal profile for each wheelpath of the travel lane for each test section at 0.15-m (6-in.) increments. Results of this work expressed as International Roughness Index (IRI) values appear in Table 3. As this pavement profile can, to some extent, be considered a reflection of the joint faulting present, fault measurements were taken at each joint (0.3 m and 0.75 m from the lane edge) using a faultmeter. A summary of the fault measurements at each of the joints is included in Table 4.

In addition to rod and level measurements, all test sections were again profiled using the SHRP high-speed profilometer in March 1993. The resulting values of IRI also appear in Table 3.

Deflection Testing

Deflection measurements were taken in late January and early February 1992 using the SHRP falling weight deflectometer (FWD) to evaluate the structural capacity of each test section. The FWD drops a set of weights from three different heights to simulate different levels of wheel loads, ultimately measuring the resulting deflection basins. Measurements were taken at the corners and mid-span of each slab edge. Joint/load transfer tests were conducted in the outside wheelpath and mid-slab throughout each test section. A summary of these results for a 9-kip load simulation is provided in Table 5. Deflection measurements were taken again in April 1993 after the treatment applications were complete.

Materials Sampling and Testing

As specified for all SHRP test sections, a thorough materials sampling and testing program was established for these sections on I–35 in Kay County, Oklahoma. Sampling included extractions of 0.1-m (4-in.) and 0.15-m (6-in.) diameter cores, 0.15-m (6-in.) auger probes, and three 1.8 m × 1.2 m (6 ft × 4 ft) test pits to a depth of 0.3 m (12 in.) just below the top of the untreated subgrade. All sampling was conducted by the Oklahoma DOT with the actual laboratory testing work being performed by a testing contractor. Preconstruction sampling was conducted in June 1992, and postconstruction sampling and testing was conducted on August 31, 1992.

Some problems were encountered with the two 50-mm (2-in.) thick lifts separating during postconstruction sampling. Every effort

TABLE 3 Profile Readings

	Preconstruction Date Surveyed: 1/14/92			Postconstruction Date Surveyed: 3/16/93		
SECTION	LEFT	RIGHT	AVERAGE	LEFT	RIGHT	AVERAGE
400602	2.16	2.05	2.12	1.12	1.07	1.09
400601	1.99	1.80	1.90	1.93	1.80	1.86
400603	1.63	1.55	1.60	0.74	0.74	0.74
400604	1.79	1.88	1.83	0.85	0.85	0.85
400607	1.93	1.53	1.74	1.09	1.07	1.07
400608	1.79	1.42	1.61	1.28	1.26	1.28
400606	1.64	1.58	1.61	0.95	0.90	0.92
400605	1.55	1.39	1.47	0.71	0.77	0.74
Average	1.81	1.65	1.73	1.08	1.06	1.07

TABLE 4 Joint Faulting Measurements

SECTION	JOINT * LOCATION	0.3 m PRE	0.3 m POST	0.75 m PRE	0.75 m POST
400602	12.4	1	0	1	0
	32	6	0	2	0
	50.6	5	0	3	0
	68.4	1	0	0	0
	88.5	5	1	5	0
	106.6	4	1	4	1
	115.4	8	8	8	6
	124.6	2	-1	1	1
	144	5	1	6	1
	162.2	4	1	1	1
	180.9	2	0	2	-1
	200.8	2	0	1	0
	219	7	3	3	1
	238	2	0	2	0
	255.9	1	0	0	1
	274.6	0	0	0	0
	294	2	3	3	2
	Average:	3	1	2	1
400601	0.5	0	0	0	1
	19.5	0	0	1	1
	38	1	2	1	1
	56.5	1	1	1	1
	70.3	8	7	1	1
	87.3	2	2	2	2
	106.1	1	2	2	2
	125.5	7	16	7	9
	144.5	6	7	4	5
	Average:	3	4	2	3
400603	18.8	4		2	
	37.2	0		0	
	56.1	1		2	
	74.7	2		3	
	93.5	1		0	
	113	3		1	
	132	5		-1	
	150.7	2		2	
	Average:	2		1	
400604	12	3		2	
	30.6	2		1	
	50	1		2	
	69.6	4		3	
	87.6	3		3	
	107.1	5		8	
	127	5		5	
	143.5	0		0	
	Average:	3		3	

SECTION	JOINT * LOCATION	0.3 m PRE	0.3 m POST	0.75 m PRE	0.75 m POST
400607	15.6	2		1	
	34.6	0		3	
	53.3	4		6	
	71.7	1		2	
	90.5	2		5	
	127.8	0		0	
	146.6	3		0	
	Average:	2		2	
400608	0.1	2		2	
	9.3	1		2	
	18.7	4		2	
	37.5	1		2	
	56.3	1		1	
	75.3	1		0	
	93.7	2		7	
	112.7	0		3	
	131.5	0		0	
	150.3	2		1	
	Average:	1		2	
400606	16.3	0		2	
	35	0		2	
	45.5	6		8	
	54.5	6		7	
	73.3	6		8	
	91.5	7		7	
	109.8	2		2	
	128.3	2		2	
	147.5	5		3	
	Average:	4		5	
400605	4.3	6	1	5	1
	23	6	1	6	1
	42	8	2	3	0
	60	2	0	3	0
	79	2	0	1	0
	98	6	0	3	1
	112.3	1	-1	2	0
	116.3	2	3	2	2
	130.8	3	1	2	0
	150	5	1	2	1
	167.5	1	1	2	1
	187	2	0	1	0
	205.3	1	0	1	1
	215	2	0	5	2
	224.4	1	1	1	2
	237	6	1	3	1
	254.8	1	1	1	1
	273.8	0	0	1	0
	292.8	4	0	4	0
	Average:	3	1	3	1

*** Measured from 0+00 of each test section.**

was made to minimize this splitting of samples, and ultimately complete cores were obtained for all but the 0.2-m (8-in.) thick overlays placed on Section 400608. For the 0.2-m (8-in.) overlay, only one complete core was obtained. The 0.2-m (8-in.) overlay was placed with two 80-mm (3-in.) lifts of Type A mix and one 50-mm (2-in.) lift of Type B mix. It was noted that the bottom 80 mm (3 in.) of this overlay was not well bound together, as aggregate dropped from the cores during sampling.

CONSTRUCTION

The project was let to Cummins Construction Inc. in November 1991. The preconstruction meeting for this project was held January 28, 1992, at the Division Office in Perry, Oklahoma. Although there were numerous questions regarding the work to be accomplished as part of this SPS-6 project, no significant concerns were expressed regarding the accomplishment of the work specified. At

TABLE 5 Summary of Deflection Results

Mean Values (microns/kPa) Drop Height 2 (141.5 kPa)

Test Section		Sensors 1	2	3	4	5	6	7
400603	Pre	.7176	.6898	.6569	.6069	.5599	.4560	.2833
	Post	.5757	.5162	.5010	.4690	.4333	.3584	.2338
400604	Pre	.9381	.9147	.8795	.8293	.7776	.6536	.4249
	Post	.7025	.6307	.6122	.5770	.5387	.4556	.3063
400606	Pre	.6760	.6477	.6114	.5638	.5167	.4225	.2671
	Post	.9473	.8087	.7891	.7451	.6972	.5910	.3915
400607	Pre	.7538	.7202	.6843	.6365	.5876	.4847	.3046
	Post	1.8558	1.4084	1.1434	.8658	.6824	.4597	.2641
400608	Pre	.7734	.7475	.7105	.6612	.6099	.5045	.3192
	Post	1.0911	.8793	.7866	.6679	.5747	.4312	.2661

this stage of the rehabilitation process, the subcontractor responsible for the "cracking and seating" of the concrete fully intended on using conventional equipment. However, the original subcontractor was replaced by another subcontractor, resulting in a change of equipment. The results of this equipment are discussed below.

For ease of construction, the following sequence of operations was agreed to by all parties: pavement breaking, overlay, retrofit edgedrains, diamond grind, saw, and seal. Pavement breaking was initiated July 27, 1992, on a small section at the beginning of the transition into Test Section 7, the first of the two break-and-seat test sections. It was quickly noted that this equipment was not a traditional concrete breaker device, but rather a resonant frequency breaker (more commonly used for rubblization). A 0.2-m (8-in.) wide resonating foot traveled along the surface of the pavement at a relatively high frequency of approximately 44 beats/sec, shattering the concrete. Although the equipment produced rubblized concrete rather than conventional break patterns for break and seat, it was determined that the equipment met the requirements of the specifications and was therefore allowed to continue.

A 39-ton pneumatic roller was used to seat the rubblized concrete. Two passes were made over each section. (A pass here is defined as one round-trip over a given area of the section.)

Deflection testing was performed on the rubblized test sections July 29, to evaluate the effect of pavement breaking on the stiffness of the test sections. Some trenching was also performed in several locations to visually examine the fracture patterns of the slabs with depth. Both evaluations indicated that the slab had been broken full-depth. It was interesting to note that the pieces near the surfaces were typically 50 mm × 50 mm (2 in. × 2 in.), whereas the pieces below the reinforcing steel were closer to 0.2 m × 0.2 m (6 in. × 6 in.).

Before initiating the overlay of the break-and-seat sections, these sections were watered down in an attempt to wash away some of the dust and fines that might inhibit bonding of the asphalt concrete to the broken slab. The first 50-mm (2-in.) lift of Type B (surface) mix was placed on Test Section 7 as well as the first 80 mm (3 in.) of Type A mix on Test Section 8 the day following deflection testing.

The plant was a Caterpillar 2000 drum mixer, located 11.25 km (7 mi) north of the project, just off of I–35, in Blackwell, Oklahoma. The paver was a Cedar Rapids Greyhound CR461. The tack coat used during paving was an SS–1. A 50:50 dilution ratio was used.

Three rollers were used to compact the hot mix. The breakdown roller was a 20-kip Hyster steel-wheeled vibratory roller, which made two passes over each section. The intermediate roller was a 24-kip Bomag pneumatic roller, which made five passes over each section, The final roller was a 27-kip Hyster steel-wheeled static roller, which made two passes over each section.

The Advanedge® pipe system was used on this project for edge drainage. This system consisted of a 0.05 m × 0.5 m (2 in. × 18 in.) rectangular plastic perforated channel that was encapsulated by a filter fabric. It was placed as close to the slab as possible [typically 0.1 m to 0.2 m (3 in. to 9 in.)], with the top of the channel positioned 30 mm (1 in.) below the top of the slab. The system was installed using a Vermeer saw to cut a trench 0.5 m deep × 0.1 m wide (20 in. deep × 4 in. wide). The Vermeer saw was equipped with an attachment that laid the pipe immediately behind the saw and pushed the sand subbase material excavated back into the hole. The sand was then compacted in place. Laterals were cut through the shoulder at a 91-m (300-ft.) spacing to drain the system off into the shoulder.

The state utilized its survey crews to come out and locate by offset the position of the existing joints in the shoulder and median before beginning overlay work on the saw-and-seal section (400604). The plan was to use these pins as an aid in positioning the saw for cutting new joints in the asphalt overlay directly above the existing joints. Unfortunately, several of the pins were displaced during some of the shoulder work performed by the contractor. The pins located along the median were still available at each of the joints, however; but there was some concern that the saw cuts would not match the joints exactly, if only this one point was used. Similarly, simply measuring the distance from a known joint would require the assumption that exact distances between joints were known. The prospect of coring to locate the joints more exactly was considered, but it was agreed that this would be a fairly time-consuming, costly, and potentially detrimental process.

Ultimately, the joints were located taking 0.2-m (6-in.) nails and driving them through the 0.1-m (4-in.) overlay. When properly positioned, the nail would be driven into the joint. When not over the joint, the nail would hit the concrete slab and the nail could not be driven in any further. Five of the eight joints were satisfactorily located in this fashion. The remaining three joints had been patched, and the joint openings left after patching were not wide enough to drive the nails into them. The approximate location of these patches were identified based on visual surveys performed prior to overlay. Only the leave joint of a patch was sawed and sealed. One of the patches did however have pins on both sides remaining, which meant that only two joints were of some concern.

It was also proposed by the local field personnel that one joint be sawed intentionally out of position [by 0.10 m (3 in. or 4 in.)] to monitor performance. It was agreed that this could prove informative. A joint was selected in one of the transition areas for this purpose. It was speculated that if the joint was sawed within 0.1 m (3 in.) of the original, the joint would perform as desired. There was some concern that the potential for spalling of the overlay might exist if the overlay was sawed too far away from the joint in the concrete surface.

Diamond grinding was performed on Sections 400602 and 400605 by Highway Services, Inc., from Rogers, Minnesota. The equipment used was a Cushion Cut diamond grinder. This unit had a 1-m (37.5 in.) wide cutting head with 168 blades and cut nine grooves per 50-mm (2-in.) span, leaving roughly 3-mm (0.1-in.) peaks and 3 mm (0.1 in.) valleys. The unit averaged roughly 122 m/hr (400 ft/hr), or 2 m/min (7 ft/min).

While diamond grinding was being completed, joint sealing was initiated in Section 2. This work progressed fairly rapidly, with two saws being used to open the joints. Immediately after the sawing was completed, the joints were water-blasted, and sand-blasting was performed just before the Dow low modulus silicone sealant was installed. The two saws were used in series, with one sawing one face of the joint and the following saw trimming the other face of the joint. This provided a clean joint to work with when the sawing was completed.

For the sawing and sealing of the joints in the asphalt overlay of Section 4, only one pass of the saw [40 mm in depth × 80 mm in width (1.5 in. × 0.3 in.)] and no cleaning operations were utilized (i.e., no water- or sand-blasting). These joints were sealed with Krafco Roadsaver 222.

With the completion of the sealing work on August 29, all work within the test sections for this SPS project was complete.

PERFORMANCE EVALUATION

The performance of the SPS–6 test sections have been monitored since the construction was completed in the fall of 1992. Three of

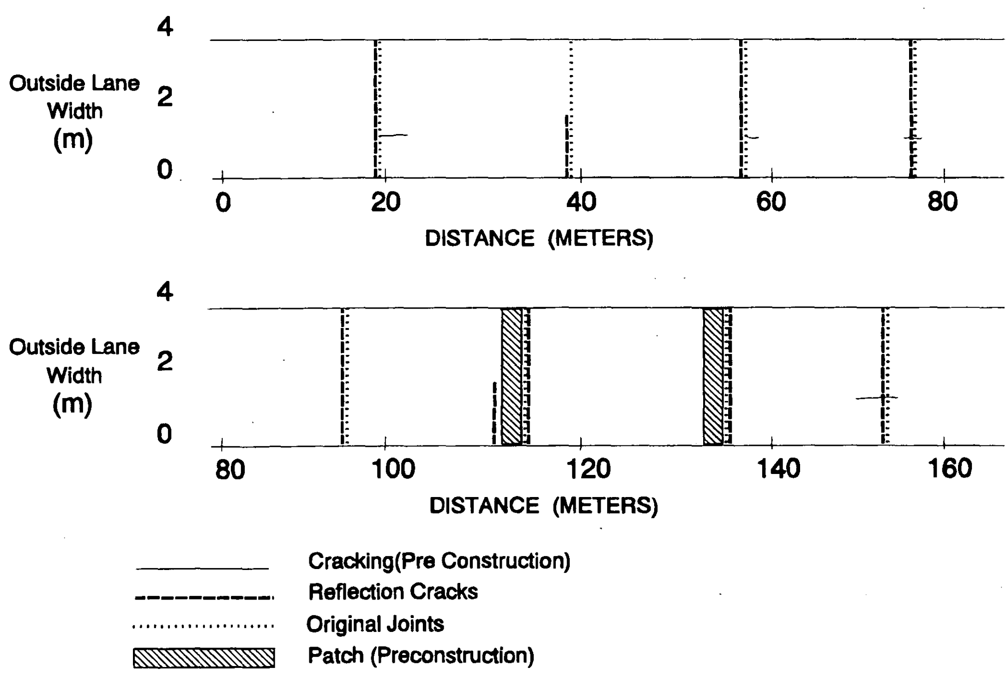


FIGURE 2 Distress summary for test section 400603 [0.1 m (4 in.) overlay].

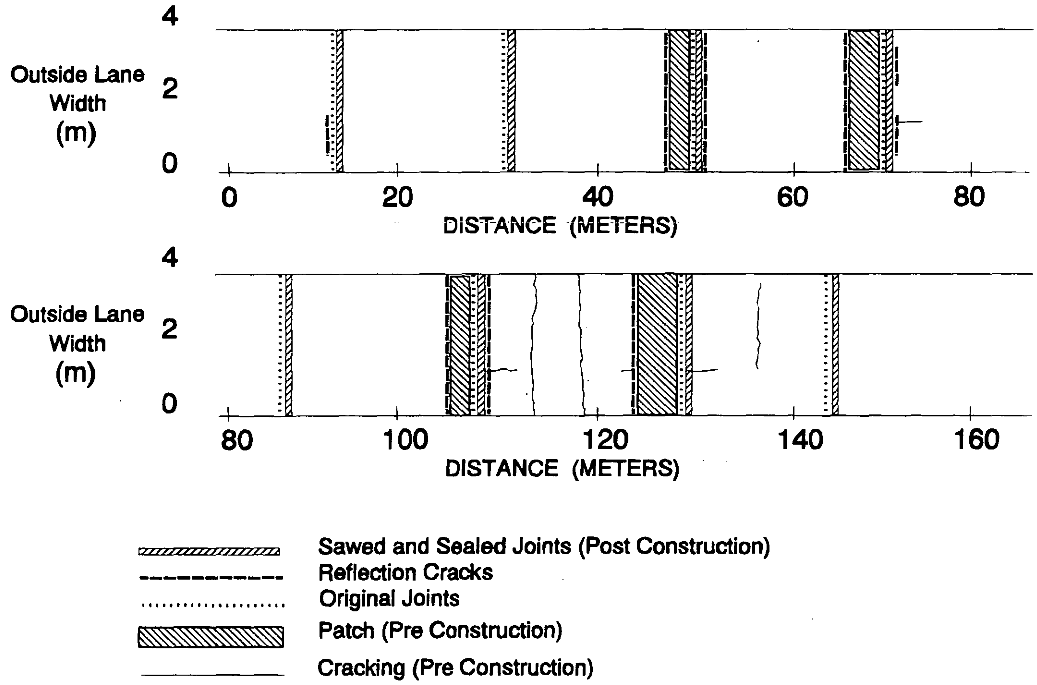


FIGURE 3 Distress summary for test section 400604 [0.1 m (4 in.) overlay, saw and seal].

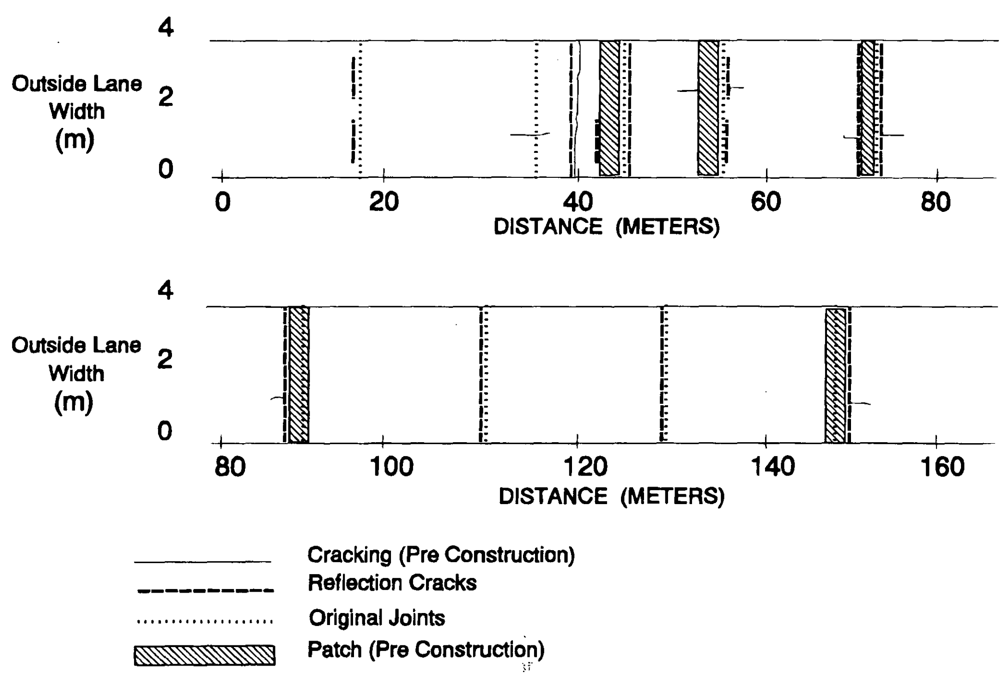


FIGURE 4 Distress summary for test section 400606 [0.1 m (4 in.) overlay with drain].

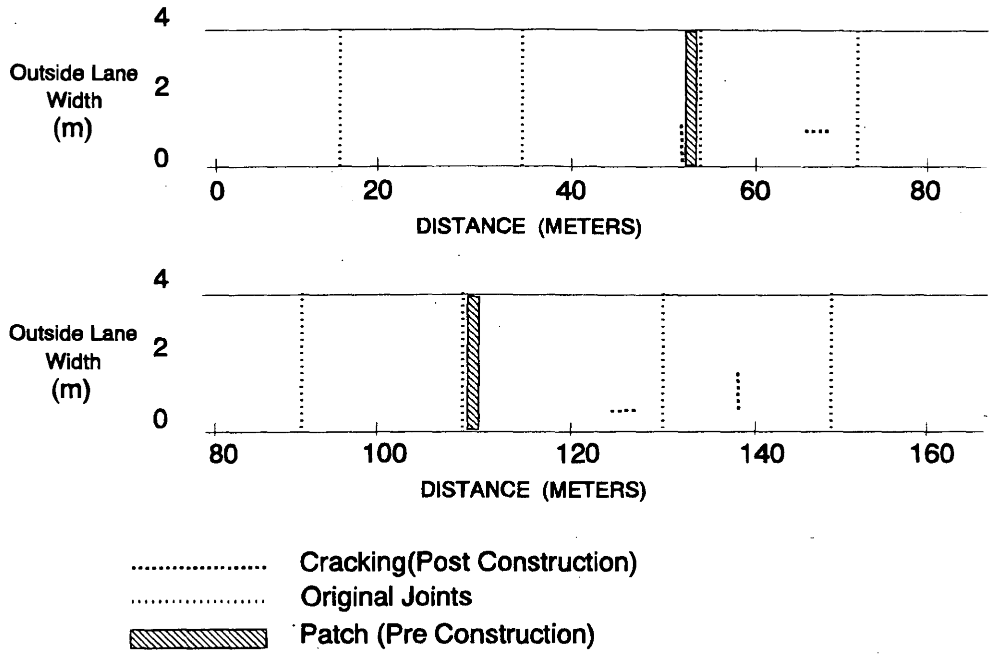


FIGURE 5 Distress summary for test section 400607 [0.1 m (4 in.) rubblized with drain].

the five test sections (400603, 400604, and 400606) have already begun to show reflective cracking. Figures 2 through 6 are graphical representations of the distress manifestations observed in March 1994.

Test Section 400603 [0.1 m (4 in.) overlay] exhibited reflective cracking at each of the underlying original joints, as well as partially along one edge of a patch. Test Section 400604 [0.1 m (4 in.) overlay, saw and seal] exhibited reflective cracking over the original joints where sawing and sealing was performed, as well as over the leave edge of underlying patches constructed before rehabilitation. Interestingly enough, the reflective cracking took place at 50 percent (four out of eight) of the locations where sawing and sealing was conducted. Test Section 400606 [0.1-m (4-in.) overlay with drain] exhibited reflective cracking at all but one location where an original joint existed under the new overlay. A reflective crack had also developed at the location of an underlying transverse crack. Test Section 400607 [rubblized with 0.1-m (4-in.) overlay and edgedrain] exhibited a very small amount of postconstruction trans-

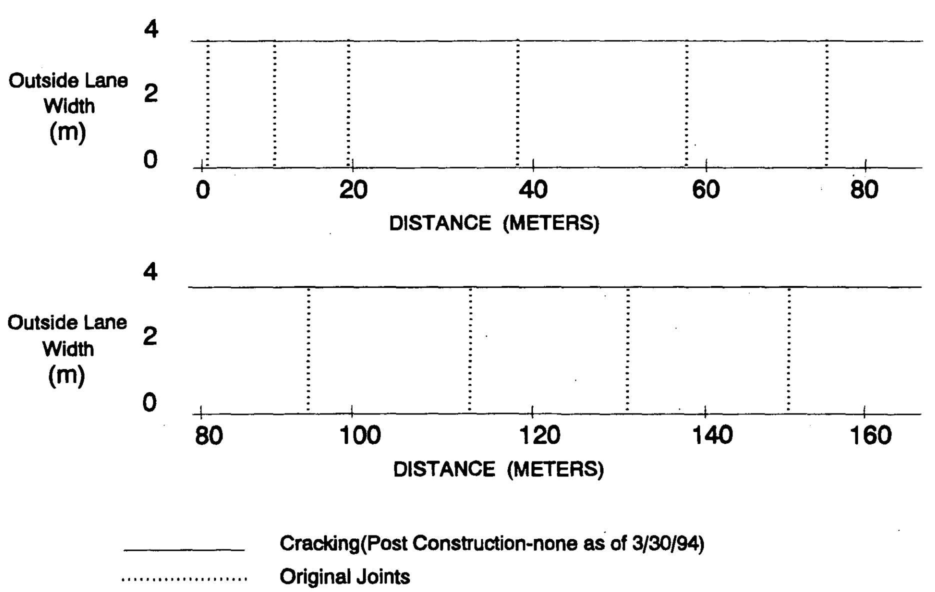


FIGURE 6 Distress summary for test section 400608 [0.2 m (8 in.) rubblized with drain].

verse and longitudinal cracking. A very short crack exists at a location where a preconstruction patch is located. Test Section 400608 [rubblized with 0.2-m (8-in.) overlay and edgedrain] exhibited no distress manifestations throughout the test section.

SUMMARY

After examining all of the pre- and postconstruction surface distress data available for these test sections, the rubblized sections are outperforming the other test sections to date. In addition, the original joints in Section 4 have less reflective cracking than similar joints in Sections 3 and 6. However, all but one preconstruction patch joint in Test Section 4 has reflected through the new overlay. Also, the process of saw and seal of the leave joint of a given patch had virtually no effect. Test Section 400608 (rubblized with 0.2-m (8-in.) overlay and edgedrain) outperformed Test Section 400607 [rubblized with 0.1 m (4 in.) overlay and edgedrain]. However, the distress manifestations that appeared on Test Section 400607 are relatively small in quantity. Additional time will determine the actual significance of the additional 0.1 m (4 in.) of material in Test Section 400608 from a cost savings standpoint.

CONCLUSIONS

After only 2 years of monitoring the SPS–6 project in Oklahoma, distinctions in performance of these test sections are already apparent. Surface distress data, collected during March of 1994, allowed for a general comparison and performance evaluation.

Sawing and sealing does appear to be somewhat effective at minimizing reflective cracking; however, the unpredictable nature of patches and their responses to load make such a procedure considerably less effective where extensive patching is involved. When comparing the current condition of each test section with the others, it is apparent that the rubblized test sections are outperforming the other test sections.

REFERENCE

1. Specific Pavement Studies: Experimental Design and Research Plan for Experiment SPS–6, Rehabilitation of Jointed Portland Cement Concrete Pavement, FHWA, U.S. Department of Transportation, working paper, April 1989.

Publication of this paper sponsored by Committee on Flexible Pavement Construction and Rehabilitation.