U.S. Department
of Transportation
Federal Highway Administration

LTPP Seasonal Monitoring Program

Site Monitoring Suspension Status Report
Section 100102, Ellendale
Delaware

Report No. FHWA-TS-97-10-01 January 1997

SEASONAL MONITORING PROGRAM SUSPENSION STATUS REPORT
DELAWARE SECTION 100102

I. INTRODUCTION

The seasonal site 100102 near Ellendale, Delaware was installed on October 4 - October 5, 1995. Seasonal data was collected continuously from October 5, 1995 to October 31, 1996. Table 1 summarizes the data collected. On October 31, 1996 site suspension activities were completed at this site according to LTPP directive SM-8 "Suspension of SMP Site Monitoring Activities." The site will remain out of operation until the next round of testing which is tentatively scheduled for October 1997.

This report entitled "SMP Site Monitoring Suspension Status Report" details the suspension preparation activities, site specific conditions, and provides information pertinent to seasonal site 100102.

II. SUSPENSION PREPARATION ACTIVITIES

The suspension preparation activities at site 100102, with the exception of a manual distress survey, transverse Dipstick surveys and a distress survey of the instrumentation area, were conducted during the final site visit on October 31, 1996. A manual distress survey of the entire section, transverse Dipstick surveys and a distress survey of the instrumentation area has been scheduled for the week of February 24, 1997. There is no distress evident as this site was overlaid in September 1996. The overlay consisted of a 50mm lift of hot mix asphalt concrete and was necessary at this particular SPS-1 test section (constructed in 1995) because localized distress was evident. In addition to the overlay, seven areas within the test section (five in the passing lane and two in the driving lane) were milled to a depth of 4" (test section depth) and replaced with hot mix asphalt concrete. The locations of the patches are presented in Table 2. Test section 100102 is located between Station 403+50 (5+00) and Station 408+50 (0+00); with the instrument hole located at Station 403+35 (5+15). PK nails were reconfirmed and replaced as necessary. The site paint markings were replaced after the overlay by Delaware DOT personnel. On this day one set of FWD tests were conducted and one set of elevations were obtained. Water table measurements were taken in the morning and afternoon. The onsite datalogger was downloaded before being dismantled. Two sets of TDR traces were extracted by the mobile datalogger. It should be noted that a resistivity probe has not been installed at this site. Repairs to the instrument hole, trench and surface temperature probe slot are not a concern because of the above referenced overlay.

The air temperature probe, tipping bucket, and the upper part of the support pole were dismantled. The lead wires from the air temperature probe and tipping bucket were removed from the cabinet and sprayed with an anti-corrosive compound. The above ground conduit from the pole to the equipment cabinet was removed and the resulting hole in the back of the cabinet sealed. The bottom part of the support pole was cleaned and lubricated prior to installing the end cap.

Table 2
Patch Locations

Patch	From	To
Passing Lane Patch 1	STA 402+87	STA 403+89
Passing Lane Patch 2	STA 404+22	STA 404+50
Passing Lane Patch 3	STA 404+85	STA 405+70
Passing Lane Patch 4	STA 406+08	STA 407+07
Passing Lane Patch 5	STA 407+45	STA 407+64
Driving Lane Patch 1	STA 405+28	STA 406+02
Driving Lane Patch 2	STA 407+41	STA 407+78

*Patch refers to Full Depth (4") of Existing Pavement Milled and Replaced

After all the wires were disconnected from the control panel, the panel was detached from the equipment cabinet with the CR10 datalogger, terminal strip, and the battery pack attached to it. The TDR cables and MRC lead wires were sprayed with anti-corrosion compounds and sealed with desiccant packs in airtight bags. All cables were hung up high inside the equipment cabinet. After the last piezometer reading was recorded the pipe was cleaned and sealed with grease. The access cover and seat were cleaned and lubricated before being covered and brought up to grade with native soil.

The profilometer survey corresponding to the close-out was conducted on December 6, 1996.

All the necessary suspension activities, with the exception of those scheduled for the week of February 24, 1997 (MDS, transverse Dipstick surveys and Instrument Hole Distress Survey), were completed on October 31, 1996. The suspended site contains all the underground instrumentation and an equipment cabinet with all the cables. The equipment cabinet was locked before leaving the site. The site was cleaned and left in a condition such that the equipment could be easily accessed when site activities resume.

III. SPECIAL SITE CONDITIONS

The installation of site 100102 followed the "LTPP Seasonal Monitoring Program: Instrumentation Installation and Data Collection Guidelines" closely except this site, as noted above, does not contain a resistivity probe. It should also be noted that this site has Campbell Scientific TDR probes installed as opposed to FHWA manufactured probes. Shortly before site suspension activities took place the site was overlaid with a 50mm lift of hot mix asphalt because of premature deterioration. As a result of the overlay in September 1996 the depth of the MRC sensors #1 to #3 are not in accordance with LTPP guidelines. Table 3 shows the new MRC depths compared to the MRC depths at the time of installation. In addition MRC sensors #1 and #2 malfunctioned in May of 1996. There were no other irregularities.

IV. SUPPLEMENTAL INFORMATION

Figure 1 shows the locations of the installed instrumentation at the site. The instrumentation hole is at Station 5+15 and the piezometer is at Station 4+00. Table 4 gives the elevations of test section 100102 before and after the overlay. All offsets are from PK nails found at the outside pavement edge.

At the time of suspension of the site there were no unresolved problems with any of the sensors other than the malfunctioning MRC#1 and MRC#2 sensors. The plots from ONSFIELD, MOBFIELD and SMPCHECK follow expected trends and expected values. FWD data could not be collected for the period November 1995 to July 1996 because bi-directional traffic was carried on the southbound lanes, which did not allow for lane closures.

Table 1

SUMMARY OF ROUND TWO SMP DATA COLLECTION TO DATE

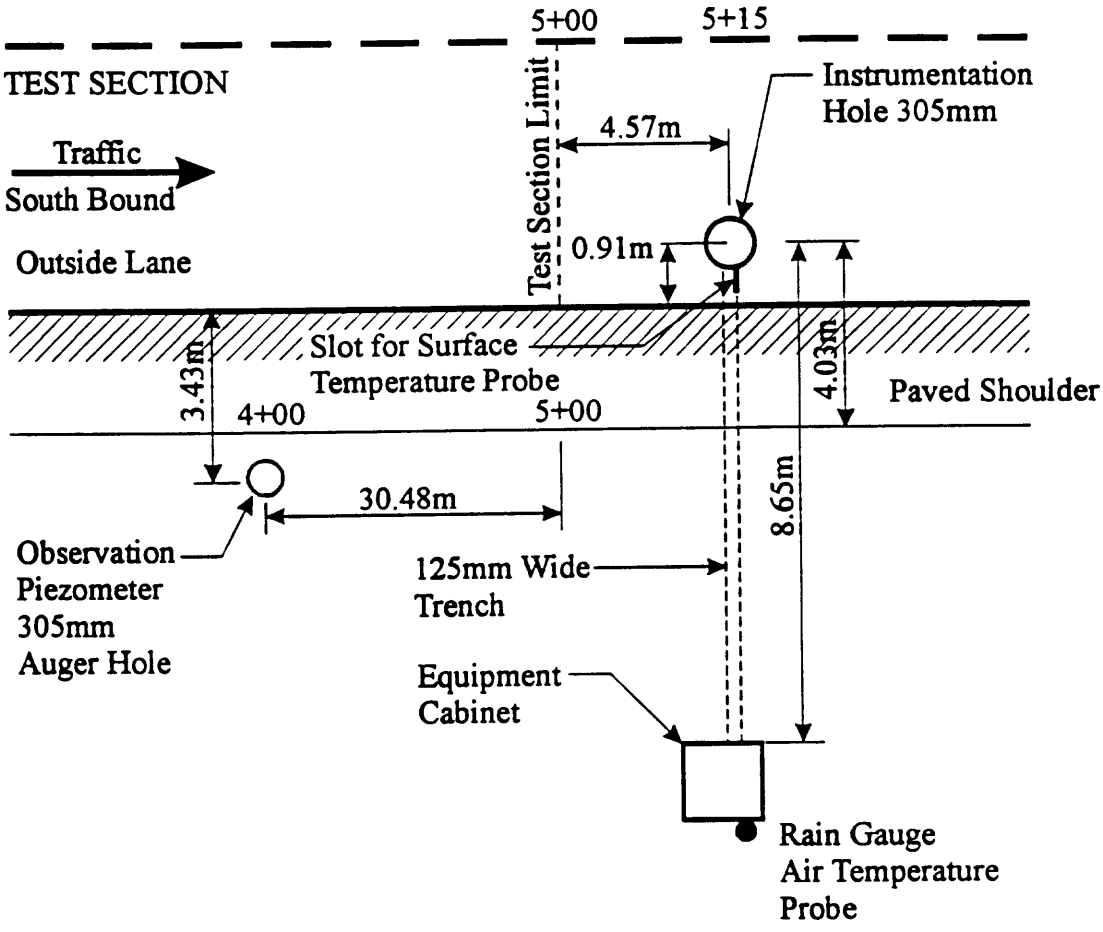
Agency Code [1 0]
LTPP Section I.D. [0 1 0 2]
Location Ellendale, DE

Test Date dd/mmm/yy	Visit Ident./ Code	ONSITE Data			MOBILE Data		Manual Data								FWD Data				Distress Data		Profile Data		Comments
		Pav Temp.	Ambient Temp.	Rainfall	Moisture (TDR)	Frost Depth (Resist.)	Backup Pav. Temp.	Backup Moisture (TDR)	Frost Depth 2 - point	Frost Depth 4 - point	Ground Water Table	Surface Elev.	Joint Open.	Joint Fault.	Surface Layer Temp.	No. of Cycles/Visit OWP	ML	PE	Manual	PASCO	Profiler	Dipstick	
05-Oct-95	A	X	X	X	X						X	X			X	2	2						
16-Jan-96	A	X	X	X	X						X												
13-Feb-96	B	X	X	X	X																		
28-Feb-96	C	X	X	X	X																24-Feb-96		
12-Mar-96	D	X	X	X	X																		
09-May-96	E	X	X	X																			On-site data only
17-Jul-96	F	X	X	X	X						X								X		31-Jul-96	X	MDS, Dipstick & FWD on 07/15/96 FWD was collected as SPS.
13-Aug-96	G	X	X	X	X						X	X			X	3	3						
24-Sep-96	H	X	X	X							X												On-site data only
31-Oct-96	I	X	X	X	X						X	X			X	1	1				08-Dec-96		Close-out

Table 3. Installed Location of MRC Thermistor Sensor

Unit	Channel Number	Depth from Pavement Surface (m)		Remarks
		Installation	After Rehab	
1	1	0.006*	0.094	This unit was installed in the AC layer.
	2	0.045	0.133	
	3	0.083	0.171	
2	4	0.154	0.242	This unit was installed below the AC layer into the subgrade.
	5	0.229	0.317	
	6	0.303	0.391	
	7	0.380	0.468	
	8	0.455	0.543	
	9	0.606	0.694	
	10	0.761	0.849	
	11	0.913	1.001	
	12	1.066	1.154	
	13	1.217	1.305	
	14	1.371	1.459	
	15	1.523	1.611	
	16	1.674	1.762	
	17	1.827	1.915	
	18	1.983	2.071	

* Note: MRC #1 was placed this close to the surface to allow for the 25 mm surface coarse that was placed at a later date.



- Height of Air Temperature Probe: 2.77m
- Height of Tipping Bucket Rain Gauge: 2.77m
- Depth of Piezometer: 4.31m

Figure 1. Location of Seasonal Monitoring Instrumentation Installed at SPS 100102

Table 4. Surface Elevation Measurements

LTPP Seasonal Monitoring Study	State Code	[10]
Surface Elevation Measurements	Test Section Number	[0102]

Survey Date	October 5, 1995 (Before) and October 31, 1996 (After)
Surveyed By	DS/GC (Before) and DS (After)
Surface Type	AC
Benchmark	Observation Piezometer - 1.000 meters - assumed

STATION	PE offset 0.30m			OWP offset 0.91m			ML offset 1.83m			IWP offset 2.74m			ILE offset 3.35m		
	After	Before	Diff.	After	Before	Diff.	After	Before	Diff.	After	Before	Diff.	After	Before	Diff.
3+00	1.2900	1.2025	0.0875	1.3000	1.2175	0.0825	1.3150	1.2375	0.0775	1.3300	1.2525	0.0775	1.3400	1.2650	0.0750
3+25	1.2925	1.2150	0.0775	1.3075	1.2300	0.0775	1.3225	1.2475	0.0750	1.3450	1.2675	0.0775	1.3525	1.2750	0.0775
3+50	1.3100	1.2275	0.0825	1.3200	1.2400	0.0800	1.3375	1.2600	0.0775	1.3600	1.2825	0.0775	1.3650	1.2875	0.0775
3+75	1.3275	1.2475	0.0800	1.3375	1.2575	0.0800	1.3525	1.2750	0.0775	1.3700	1.2925	0.0775	1.3800	1.3000	0.0800
4+00	1.3450	1.2600	0.0850	1.3575	1.2750	0.0825	1.3725	1.2925	0.0800	1.3875	1.3125	0.0750	1.3950	1.3200	0.0750
4+25	1.3575	1.2750	0.0825	1.3675	1.2875	0.0800	1.3825	1.3050	0.0775	1.3950	1.3225	0.0725	1.4025	1.3275	0.0750
4+50	1.3650	1.2800	0.0850	1.3750	1.2975	0.0775	1.3900	1.3125	0.0775	1.4075	1.3325	0.0750	1.4150	1.3425	0.0725
4+75	1.3750	1.2900	0.0850	1.3875	1.3025	0.0850	1.4000	1.3200	0.0800	1.4175	1.3425	0.0750	1.4250	1.3525	0.0725
5+00	1.3875	1.3050	0.0825	1.4000	1.3175	0.0825	1.4150	1.3350	0.0800	1.4300	1.3525	0.0775	1.4375	1.3600	0.0775
5+09	1.3925	1.3050	0.0875	1.4050	1.3200	0.0850	1.4200	1.3400	0.0800	1.4350	1.3550	0.0800	1.4425	1.3650	0.0775
5+15	1.3975	1.3100	0.0875	1.4075	1.3200	0.0875	1.4250	1.3400	0.0850	1.4400	1.3575	0.0825	1.4450	1.3675	0.0775
5+21	1.4025	1.3100	0.0925	1.4125	1.3250	0.0875	1.4300	1.3450	0.0850	1.4425	1.3625	0.0800	1.4500	1.3725	0.0775

PE	Pavement Edge
OWP	Outer Wheel Path
ML	Mid Lane
IWP	Inner Wheel Path
ILE	Inner Lane Edge

Notes: 1. Offsets are measured from the PK nails at the outside of the pavement stripe at the pavement edge.

2. Before refers to before the overlay in September 1996 and After refers to after the overlay.

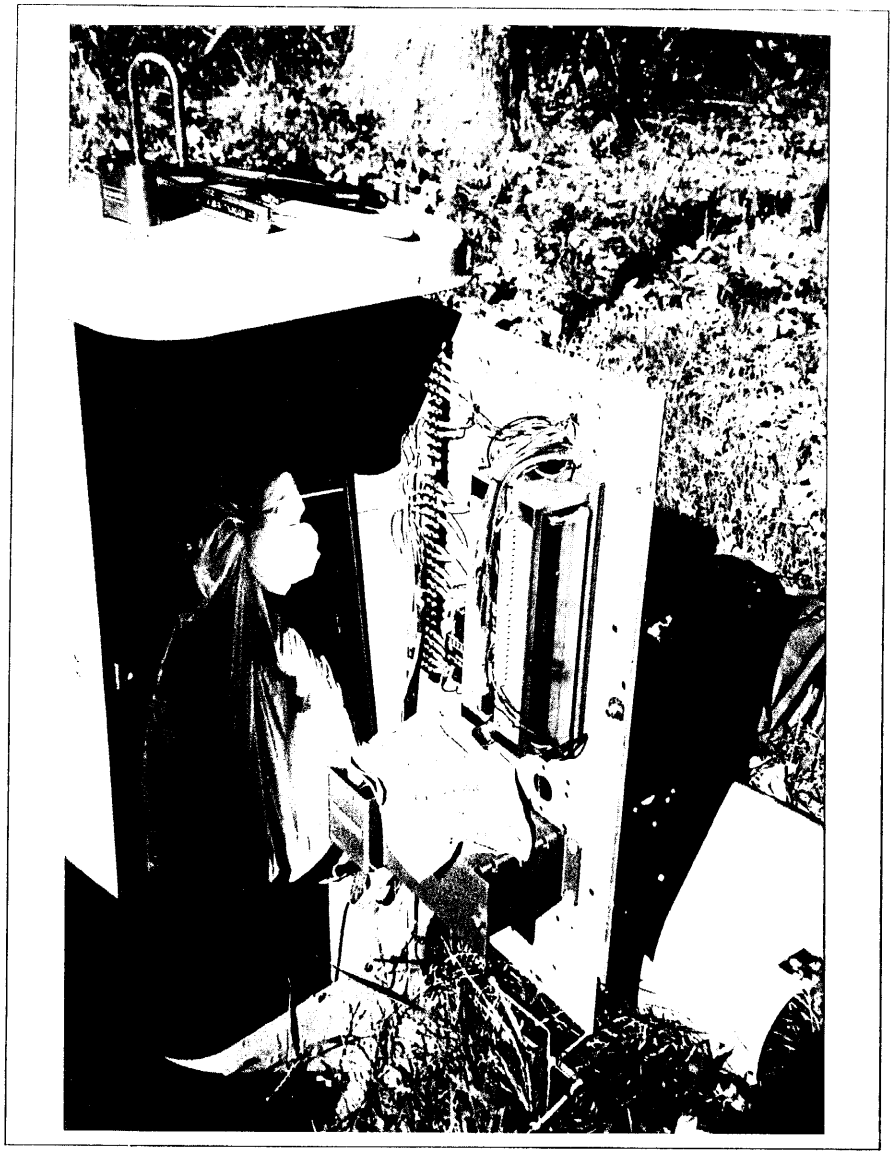


Photo 1: Inside Equipment Cabinet, Seasonal Site 100102,
October 1996, Before Suspension Activities

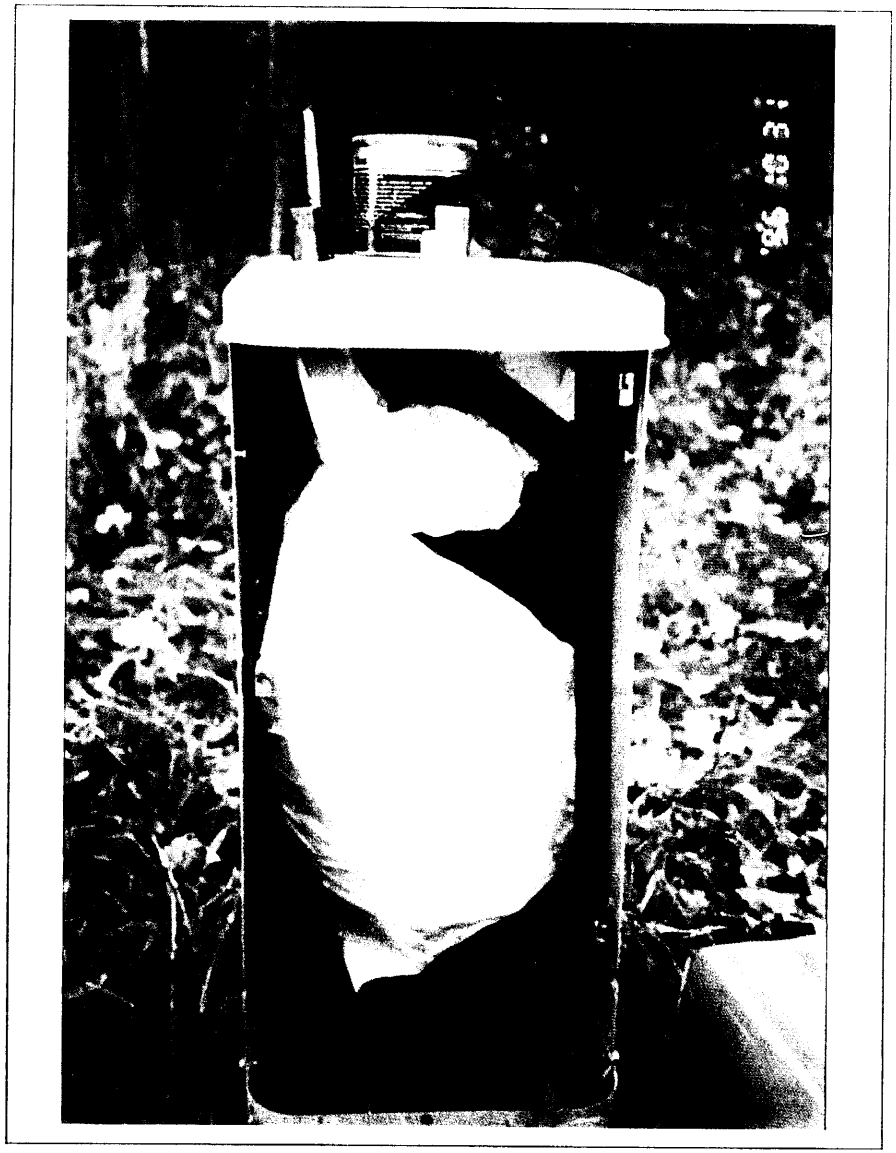


Photo 2: Inside Equipment Cabinet, Seasonal Site 100102,
October 1996, After Suspension Activities