Evaluation of Composite Pavement Unbonded Overlays: Phase III

National Concrete Pavement Technology Center

Final Report
August 2006

Sponsored by
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16. Abstract

In recent years, thin whitetopping has evolved as a viable rehabilitation technique for deteriorated asphalt cement concrete (ACC) pavements. Numerous projects have been constructed and tested, allowing researchers to identify the important elements contributing to the projects' successes. These elements include surface preparation, overlay thickness, synthetic fiber reinforcement usage, joint spacing, and joint sealing. Although the main factors affecting thin whitetopping performance have been identified by previous research, questions still existed as to the optimum design incorporating these variables. The objective of this research is to investigate the interaction between these variables over time.

Laboratory testing and field testing were conducted to achieve the research objectives. Laboratory testing involved shear testing of the bond between the portland cement concrete (PCC) overlay and the ACC surface. Field testing involved falling weight deflectometer deflection responses, measurement of joint faulting and joint opening, and visual distress surveys on the 9.6-mile project. The project was located on Iowa Highway 13 extending north from the city of Manchester, Iowa, to Iowa Highway 3 in Delaware County. Variables investigated include ACC surface preparation, PCC thickness, slab size, synthetic fiber reinforcement usage, and joint spacing.

This report documents the planning, construction, and performance of each variable in the time period from summer 2002 through spring 2006. The project has performed well with only minor distress identification since its construction.

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EVALUATION OF COMPOSITE PAVEMENT UNBONDED OVERLAYS: PHASE III

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August 2006

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INTRODUCTION

Background

Iowa is one of several states known for its large amounts of portland cement concrete (PCC) pavements. The design life of the initial pavement systems was established as 20 years. This meant that by the 1970s many of the systems had reached or were exceeding their design life. The decision was made to widen and resurface these pavements with asphalt cement concrete (ACC). This philosophy was used to extend the life for 10–15 years, or until funding could be found to replace the pavements.

Rather than continue to overlay these composite pavements with asphalt, concrete alternatives that provide longer life at a lower life-cycle cost were needed. Thin, unbonded concrete overlays are a relatively new option for the paving industry. Already, unbonded PCC overlays have been used to extend the pavement life of Iowa Highway 21 near Belle Plaine, Iowa. This research yielded several valuable findings about slab thickness, bond strength, and the use of fiber reinforcement in the concrete. However, there is a definite need for further research in order to present a cost-effective concrete alternative to asphalt overlays.

Research Objectives

The goal of this research project was to measure the stability and durability of unbonded, thin PCC overlays over time. In conducting this research, the following factors were considered:

- Bonding between the PCC and ACC layers
- Joint spacing
- PCC thickness
- Use of concrete fibers in the concrete
- Surface preparation
- Joint/crack preparation in the existing pavement

The objectives of this research were accomplished by conducting both laboratory and field tests, collecting data, and analyzing the data appropriately. Following these steps, a final report containing information regarding the various research components was produced. The report documents practices and results as well as information concerning the achievements of the research.

Research Plan/Approach

After analyzing the performance of past thin overlay projects, it was determined that Iowa Highway 13 provided the advantage of allowing researchers to evaluate the top performing design alternatives within one roadway. Design variables considered in this project include the following:

- ACC surface preparation (milled, 1 in. hot mix asphalt (HMA) stress relief course, or broomed-only surface)
- Use of concrete fibers (sections of polypropylene monofilament, polypropylene fibrillated, proprietary structural, or without fibers)
- Pavement thickness (3.5 or 4.5 in.)
- Joint spacing (sections measuring 4.5 x 4.5 ft., 6 x 6 ft., or 9 x 9 ft.)
- Joint/crack preparation (bridged with concrete or a #4 rebar stapled to the pavement surface)

Table 1 shows the design characteristics of this project and other thin and ultrathin (UTW) projects.

Table 1. Design characteristics of current thin and UTW projects

Design Characteristics	Project Reference			
	A	B	C	D
Location (date)	Entrance road to waste management facility, Louisville, Kentucky (1991)	Iowa Highway 21, between Victor and Belle Plaine, Iowa (1994)	119th Street, Leawood, Kansas (1995)	Iowa Highway 13, between Manchester, Iowa, and Iowa Highway 3 (2002)
Concrete thickness (in.)	2, 3.5	2, 4, 6, 8	2	3.5, 4.5
Joint spacing (ft.)*	2, 6	2, 4, 6, 12	3, 4	4.5, 6, 9
Asphalt treatment	Milled	Patch and scarify, patch only, cold in-place recycle	Milled	Milled, HMA stress relief layer, broomed only
Fibers	Yes	Some	Some	Some

*Joint spacing was used to create square panels in each of these projects.

The project was divided into 183 sections according to the previously mentioned variables, including 91 test sections. The test sections had lengths of 400 ft., except for four that had to be increased to 600 ft. to accommodate changes to the project beginning and ending points. Each of the test sections represents a stretch of roadway where all of the variables remained constant. Changes in variables were accomplished in the transition sections which precede each of the test sections. Table 2 displays the design properties for the project test sections.

Table 2. Test section characteristics

Section		Station to Station		Base Prep.	Depth (in.)	Fiber Type**	Panel Size (ft. x ft.)	Tied Outer Joint
No.*	Type							
8	Trans	51+00	52+00	Scarify	3.5	B	4.5	—
9	Test	52+00	56+00	Scarify	3.5	B	4.5	—
10	Trans	56+00	57+00	Scarify	3.5	B	4.5-6.0	—
11	Test	57+00	61+00	Scarify	3.5	B	6	—
12	Trans	61+00	62+00	Scarify	3.5	B	6	—
13	Test	62+00	66+00	Scarify	3.5	B	6	Tied joint
14	Trans	66+00	67+00	Scarify	3.5	No	6	—
15	Test	67+00	71+00	Scarify	3.5	C	6	—
16	Trans	71+00	72+00	Scarify	3.5	C	6	—

Table 2. (continued)

Section		Station to Station		Base Prep.	Depth (in.)	Fiber Type**	Panel Size (ft. x ft.)	Tied Outer Joint
No.*	Type							
17	Test	72+00	76+00	Scarify	3.5	C	6	—
18	Trans	76+00	77+00	Scarify	3.5	C	6	—
19	Test	77+00	81+00	Scarify	3.5	C	6	—
20	Trans	81+00	82+00	Scarify	3.5	C	6	—
21	Test	82+00	86+00	Scarify	3.5	C	6	Tied joint
22	Trans	86+00	87+00	Scarify	3.5	No	6.0–4.5	—
23	Test	87+00	91+00	Scarify	3.5	No	4.5	—
24	Trans	91+00	92+00	Scarify	3.5	No	4.5	—
25	Test	92+00	96+00	Scarify	3.5	No	4.5	—
26	Trans	96+00	97+00	Scarify	3.5	No	4.5–6.0	—
27	Test	97+00	101+00	Scarify	3.5	No	6	—
28	Trans	101+00	102+00	Scarify	3.5	No	6	—
29	Test	102+00	106+00	Scarify	3.5	No	6	Tied joint
30	Trans	106+00	107+00	Scarify	3.5	No	6	—
31	Test	107+00	113+00	Scarify	3.5	A	6	Tie center 200’
32	Trans	113+00	113+50	Scarify	3.5	A	6–4.5	—
33	Test	113+50	119+50	Scarify	3.5	A	4.5	—
33.5	Trans	119+50	120+00	Scarify	3.5–4.5	A	4.5	—
34	Test	120+00	124+00	Scarify	4.5	A	4.5	—
35	Trans	124+00	125+00	Scarify	4.5	A	4.5	—
36	Test	125+00	129+00	Scarify	4.5	A	4.5	Tied joint
37	Trans	129+00	130+00	Scarify	4.5	A	4.5–6.0	—
38	Test	130+00	134+00	Scarify	4.5	A	6	—
39	Trans	134+00	135+00	Scarify	4.5	A	6	—
40	Test	135+00	139+00	Scarify	4.5	A	6	—
41	Trans	139+00	140+00	Scarify	4.5	No	6.0–4.5	—
42	Test	140+00	144+00	Scarify	4.5	B	4.5	—
43	Trans	144+00	145+00	Scarify	4.5	B	4.5	—
44	Test	145+00	149+00	Scarify	4.5	B	4.5	Tied joint
45	Trans	149+00	150+00	Scarify	4.5	B	4.5–6	—
46	Test	150+00	154+00	Scarify	4.5	B	6	—
47	Trans	154+00	155+00	Scarify	4.5	B	6	—
48	Test	155+00	159+00	Scarify	4.5	B	6	—
49	Trans	159+00	160+00	Scarify	4.5	No	6.0–9.0	—
50	Test	160+00	164+00	Scarify	4.5	C	9	—
51	Trans	164+00	165+00	Scarify	4.5	C	9	—
52	Test	165+00	169+00	Scarify	4.5	C	9	—
53	Trans	169+00	170+00	Scarify	4.5	C	9	—
54	Test	170+00	174+00	Scarify	4.5	C	9	Tied joint
55	Trans	174+00	175+00	Scarify	4.5	C	9	—
56	Test	175+00	179+00	Scarify	4.5	C	9	—
57	Trans	179+00	181+50	Scarify	4.5	No	9.0–6.0	—
58	Trans	181+50	183+75	Remove	0.0–4.5	No	6	—
59	Test	183+75	186+75	Remove	4.5	No	6	—

Table 2. (continued)

Section No.*	Section Type	Station to Station		Base Prep.	Depth (in.)	Fiber Type**	Panel Size (ft. x ft.)	Tied Outer Joint
60	Trans	186+75	189+00	Remove	4.5–0.0	No	6.0–4.5	—
61	Test	189+00	193+00	Scarify	4.5	No	4.5	—
62	Trans	193+00	194+00	Scarify	4.5	No	4.5	—
63	Test	194+00	198+00	Scarify	4.5	No	4.5	Tied joint
64	Trans	198+00	199+00	Scarify	4.5	No	4.5–6.0	—
65	Test	199+00	203+00	Scarify	4.5	No	6	—
66	Trans	203+00	204+00	Scarify	4.5	No	6	—
67	Test	204+00	208+00	Scarify	4.5	No	6	—
68	Trans	208+00	209+00	HMA S.R.	4.5–3.5	No	6.0–4.5	—
69	Test	209+00	213+00	HMA S.R.	3.5	A	4.5	—
70	Trans	213+00	214+00	HMA S.R.	3.5	A	4.5	—
71	Test	214+00	218+00	HMA S.R.	3.5	A	4.5	—
72	Trans	218+00	219+00	HMA S.R.	3.5	A	4.5–6.0	—
73	Test	219+00	223+00	HMA S.R.	3.5	A	6	—
74	Trans	223+00	224+00	HMA S.R.	3.5	A	6	—
75	Test	224+00	228+00	HMA S.R.	3.5	A	6	Tied joint
76	Trans	228+00	229+00	HMA S.R.	3.5	No	6.0–4.5	—
77	Test	229+00	233+00	HMA S.R.	3.5	B	4.5	—
78	Trans	233+00	234+00	HMA S.R.	3.5	B	4.5	—
79	Test	234+00	238+00	HMA S.R.	3.5	B	4.5	—
80	Trans	238+00	239+00	HMA S.R.	3.5	B	4.5-6.0	—
81	Test	239+00	243+00	HMA S.R.	3.5	B	6	—
82	Trans	243+00	244+00	HMA S.R.	3.5	B	6	—
83	Test	244+00	248+00	HMA S.R.	3.5	B	6	Tied joint
84	Trans	248+00	249+00	HMA S.R.	3.5	No	6.0–9.0	—
85	Test	249+00	253+00	HMA S.R.	3.5	C	9	—
86	Trans	253+00	254+00	HMA S.R.	3.5	C	9	—
87	Test	254+00	258+00	HMA S.R.	3.5	C	9	—
88	Trans	258+00	259+75	Remove	0.0–3.5	No	4.5	—
89	Test	259+75	263+25	Remove	3.5	No	4.5	—
90	Trans	263+25	265+00	Remove	3.5–0.0	No	4.5	—
91	Test	265+00	269+00	HMA S.R.	3.5	C	9	—
92	Trans	269+00	270+00	HMA S.R.	3.5	C	9	—
93	Test	270+00	274+00	HMA S.R.	3.5	C	9	Tied joint
94	Trans	274+00	275+00	HMA S.R.	3.5	No	9.0–4.5	—
95	Test	275+00	279+00	HMA S.R.	3.5	No	4.5	—
97	Trans	279+00	280+00	HMA S.R.	3.5	No	4.5	—
98	Test	280+00	284+00	HMA S.R.	3.5	No	4.5	—
99	Trans	284+00	285+00	HMA S.R.	3.5	No	4.5–6.0	—
100	Test	285+00	289+00	HMA S.R.	3.5	No	6	—
101	Trans	289+00	290+00	HMA S.R.	3.5	No	6	—
102	Test	290+00	294+00	HMA S.R.	3.5	No	6	Tied joint
103	Trans	294+00	295+00	HMA S.R.	3.5–4.5	No	6.0–4.5	—
104	Test	295+00	299+00	HMA S.R.	4.5	A	4.5	—
105	Trans	299+00	300+00	HMA S.R.	4.5	A	4.5	—

Table 2. (continued)

Section No.*	Section Type	Station to Station		Base Prep.	Depth (in.)	Fiber Type**	Panel Size (ft. x ft.)	Tied Outer Joint
106	Test	300+00	304+00	HMA S.R.	4.5	A	4.5	Tied joint
107	Trans	304+00	305+00	HMA S.R.	4.5	A	4.5–6.0	—
108	Test	305+00	309+00	HMA S.R.	4.5	A	6	—
109	Trans	309+00	310+00	HMA S.R.	4.5	A	6	—
110	Test	310+00	314+00	HMA S.R.	4.5	A	6	—
111	Trans	314+00	315+00	HMA S.R.	4.5	No	6.0–4.5	—
112	Test	315+00	319+00	HMA S.R.	4.5	B	4.5	—
113	Trans	319+00	320+00	HMA S.R.	4.5	B	4.5	—
114	Test	320+00	324+00	HMA S.R.	4.5	B	4.5	Tied joint
115	Trans	324+00	325+00	HMA S.R.	4.5	B	4.5–6.0	—
116	Test	325+00	329+00	HMA S.R.	4.5	B	6	—
117	Trans	329+00	330+00	HMA S.R.	4.5	B	6	—
118	Test	330+00	334+00	HMA S.R.	4.5	B	6	—
119	Trans	334+00	335+00	HMA S.R.	4.5	No	6.0–9.0	—
120	Test	335+00	339+00	HMA S.R.	4.5	C	9	—
121	Trans	339+00	340+00	HMA S.R.	4.5	C	9	—
122	Test	340+00	344+00	HMA S.R.	4.5	C	9	Tied joint
123	Trans	344+00	345+00	HMA S.R.	4.5	C	9	—
124	Test	345+00	349+00	HMA S.R.	4.5	C	9	—
125	Trans	349+00	350+00	HMA S.R.	4.5	C	9	—
126	Test	350+00	354+00	HMA S.R.	4.5	C	9	—
127	Trans	354+00	355+00	HMA S.R.	4.5	No	9.0–4.5	—
128	Test	355+00	359+00	HMA S.R.	4.5	No	4.5	—
129	Trans	359+00	360+00	HMA S.R.	4.5	No	4.5	—
130	Test	360+00	364+00	HMA S.R.	4.5	No	4.5	Tied joint
131	Trans	364+00	365+00	HMA S.R.	4.5	No	4.5–6.0	—
132	Test	365+00	369+00	HMA S.R.	4.5	No	6	—
133	Trans	369+00	370+00	HMA S.R.	4.5	No	6	—
134	Test	370+00	374+00	HMA S.R.	4.5	No	6	—
135	Trans	374+00	375+00	Patch	4.5–3.5	No	6.0–4.5	—
136	Test	375+00	379+00	Patch	3.5	A	4.5	—
137	Trans	379+00	380+00	Patch	3.5	A	4.5	—
138	Test	380+00	384+00	Patch	3.5	A	4.5	—
139	Trans	384+00	385+00	Patch	3.5	A	4.5–6.0	—
140	Test	385+00	389+00	Patch	3.5	A	6	—
141	Trans	389+00	390+00	Patch	3.5	A	6	—
142	Test	390+00	394+00	Patch	3.5	A	6	Tied joint
143	Trans	394+00	395+00	Patch	3.5	No	6.0–4.5	—
144	Test	395+00	399+00	Patch	3.5	B	4.5	—
145	Trans	399+00	400+00	Patch	3.5	B	4.5	—
146	Test	400+00	404+00	Patch	3.5	B	4.5	—
147	Trans	404+00	405+00	Patch	3.5	B	4.5–6.0	—
148	Test	405+00	409+00	Patch	3.5	B	6	—
149	Trans	409+00	410+00	Patch	3.5	B	6	—
150	Test	410+00	414+00	Patch	3.5	B	6	Tied joint

Table 2. (continued)

Section No.*	Section Type	Station to Station		Base Prep.	Depth (in.)	Fiber Type**	Panel Size (ft. x ft.)	Tied Outer Joint
151	Trans	414+00	415+00	Patch	3.5	No	6	—
152	Test	415+00	419+00	Patch	3.5	C	6	—
153	Trans	419+00	420+00	Patch	3.5	C	6	—
154	Test	420+00	424+00	Patch	3.5	C	6	—
155	Trans	424+00	425+00	Patch	3.5	C	6	—
156	Test	425+00	429+00	Patch	3.5	C	6	Tied joint
157	Trans	429+00	430+00	Patch	3.5	C	6	—
158	Test	430+00	434+00	Patch	3.5	C	6	—
159	Trans	434+00	435+00	Patch	3.5	No	6.0–4.5	—
160	Test	435+00	439+00	Patch	3.5	No	4.5	—
161	Trans	439+00	440+00	Patch	3.5	No	4.5	—
162	Test	440+00	444+00	Patch	3.5	No	4.5	—
163	Trans	444+00	445+00	Patch	3.5	No	4.5–6.0	—
164	Test	445+00	449+00	Patch	3.5	No	6	—
165	Trans	449+00	450+00	Patch	3.5	No	6	—
166	Test	450+00	454+00	Patch	3.5	No	6	Tied joint
167	Trans	454+00	455+00	Patch	3.5–4.5	No	6.0–4.5	—
168	Test	455+00	459+00	Patch	4.5	A	4.5	—
169	Trans	459+00	459+50	Patch	4.5	A	4.5	—
170	Test	459+50	463+50	Patch	4.5	A	4.5	Tied joint
171	Trans	463+50	464+00	Patch	4.5	A	4.5–6.0	—
172	Test	464+00	468+00	Patch	4.5	A	6	—
173	Trans	468+00	468+50	Patch	4.5	A	6	—
174	Test	468+50	472+50	Patch	4.5	A	6	—
175	Trans	472+50	473+00	Patch	4.5	No	6.0–4.5	—
176	Test	473+00	477+00	Patch	4.5	B	4.5	—
177	Trans	477+00	477+50	Patch	4.5	B	4.5	—
178	Test	477+50	481+50	Patch	4.5	B	4.5	Tied joint
179	Trans	481+50	482+00	Patch	4.5	B	4.5–6.0	—
180	Test	482+00	486+00	Patch	4.5	B	6	—
181	Trans	486+00	486+50	Patch	4.5	B	6	—
182	Test	486+50	490+50	Patch	4.5	B	6	—
183	Trans	490+50	491+00	Patch	4.5	No	6.0–9.0	—
184	Test	491+00	495+00	Patch	4.5	C	9	—
185	Trans	495+00	495+50	Patch	4.5	C	9	Tied joint
186	Test	495+50	499+50	Patch	4.5	C	9	—
188	Trans	499+50	500+50	Patch	4.5	No	9–4.5	—
189	Test	500+50	506+60	Patch	4.5	No	4.5	Tie center 200'
190	Trans	506+60	507+60	Patch	4.5	No	4.5–6	—
191	Test	507+60	513+70	Patch	4.5	No	6	—
	EOP		513+70					—

*Sections 1–7 were not used due to section changes at the project beginning point. Section 33.5 was added to the project after the numbering system had been introduced.

**A = polypropylene fibrillated, B = polypropylene monofilament, C = W.R. Grace structural fibers, No = no fiber reinforcement.

TEST SITE DESCRIPTION

Existing pavement condition was a major factor in the site selection. Care was also taken to choose a project that could be constructed during the summer months of June through August. These dates were used to reduce the effects road closure would have on the through traffic as well as the school traffic. It was also desirable to take advantage of the warm, summer temperatures to increase the speed of concrete strength development.

The Iowa Highway 13 project is a stretch of roadway that extends 9.6 miles from Manchester, Iowa to Iowa Highway 3 in Delaware County. Figure 1 illustrates the project location. This portion of Iowa 13 is a two-lane rural roadway, 24 ft. in width. It has a narrow granular-surfaced shoulder and a rolling longitudinal grade with minimum ditch depths approximately 3 to 6 ft. below the top of the pavement.

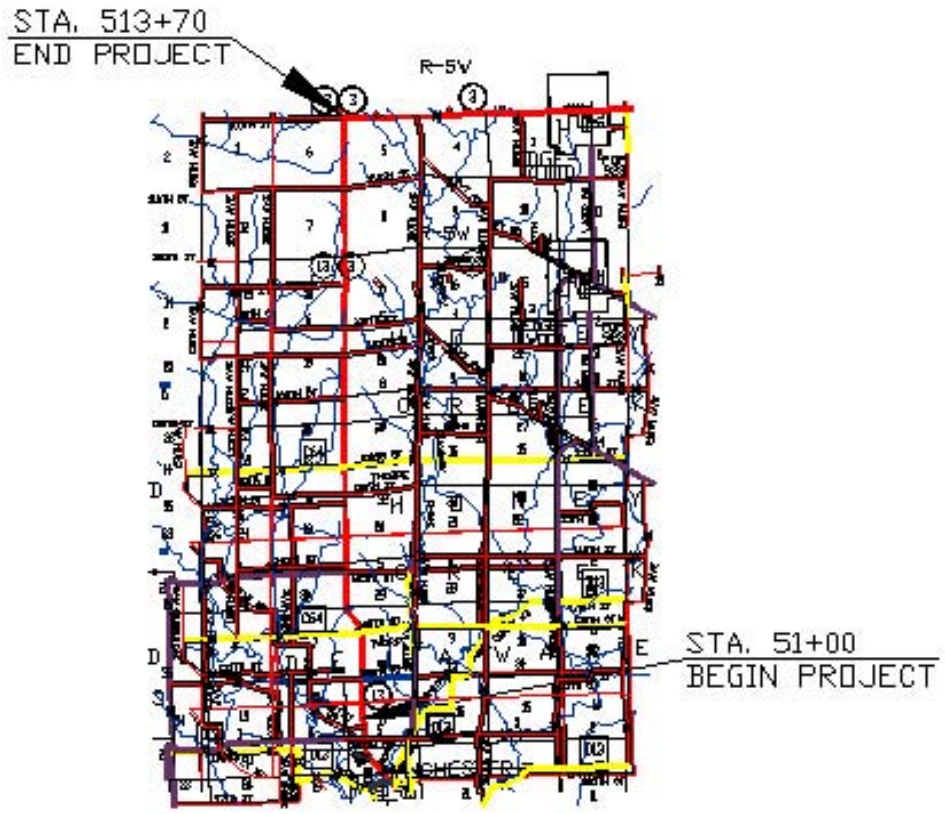

Figure 1. Project location

In 1931, the first improvements were made to Iowa Highway 13 in the project area. The improvements included a thickened edge pavement with 10 in. depths at each edge and 7 in. depth at the centerline. Pavement was 18 ft. wide, centered on the roadbed. The pavement cross-section also included a 4 in. high lip curb on each edge to control pavement drainage. Longitudinal subdrains were placed at the low points of the roadway to facilitate water runoff. Table 3 shows the stationing and indicates the side of the road of existing subdrains.

Table 3. Stationing and side of the road of new/existing longitudinal subdrains

Existing Subdrain Locations			Constructed Subdrain Locations		
Station to Station		Location	Station to Station		Location
39+50	43+00	Right	19+00	22+00	Right
58+00	65+00	Right	76+00	81+00	Left
116+00	119+00	Left	76+00	81+00	Right
127+75	132+50	Left	85+00	90+00	Right
138+50	143+00	Left	95+00	98+50	Right
152+00	159+00	Right	104+00	109+00	Right
208+00	220+00	Right	109+00	112+00	Right
226+00	237+00	Right	119+00	124+00	Left
265+25	275+00	Both	129+00	133+00	Right
280+00	286+00	Right	166+00	172+00	Right
280+00	287+00	Left	169+00	173+00	Left
310+00	316+00	Both	172+00	174+00	Right
325+00	330+00	Both	177+00	182+00	Left
343+00	348+50	Both	193+00	198+00	Left
353+00	361+00	Both	248+00	252+00	Right
364+00	372+00	Both	260+25	262+00	Right
375+00	381+00	Both	291+00	297+00	Right
384+00	390+00	Both	391+00	392+50	Right
393+00	400+00	Both	391+00	392+50	Left
402+00	407+00	Right	409+00	411+50	Right
422+00	431+00	Both	411+50	414+00	Right
433+00	438+00	Both	415+00	420+00	Right
439+00	444+00	Both	454+00	456+90	Right
445+00	450+00	Left	457+10	460+00	Right
445+00	451+00	Right	460+00	465+00	Right
473+00	486+00	Both	465+00	470+00	Right
			489+00	494+00	Right
			502+40	507+00	Right
			507+00	510+00	Right
			510+00	515+00	Left

The concrete slab was used as the driving surface until 1964, when 2 in. of Type B ACC was placed over it. This was done in order to both fill in the curbed section on the outer wheel path and rehabilitate the driving surface. In 1984, another 3 in. ACC widening surface was applied to the roadway. The first lift was 1.5 in. of Type B ACC binder, and the surface layer was 1.5 in. of Type A ACC. This overlay extended the roadway from its original 18 ft. to its present 24 ft. width. Figure 2 shows the pavement layers and the dates of their construction.

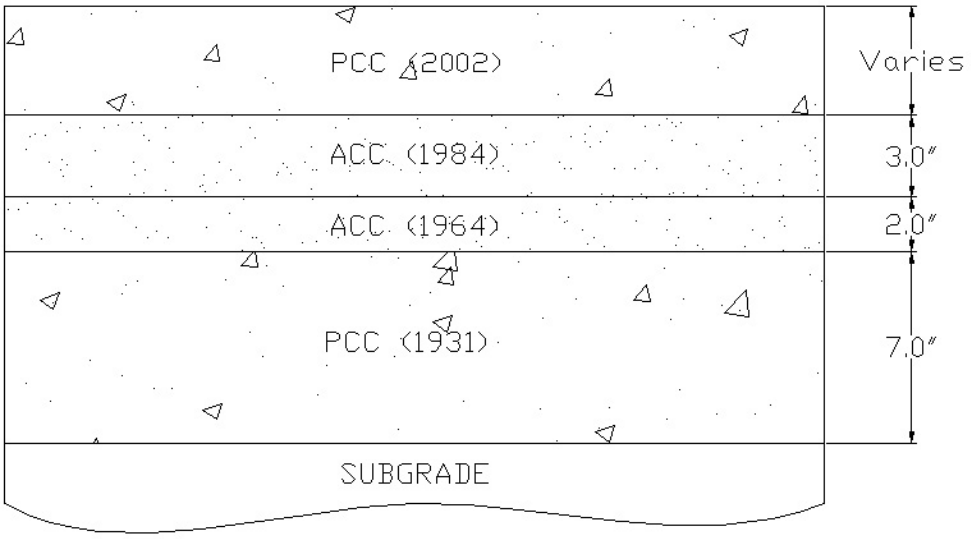

Figure 2. Pavement layers and the dates of construction

In 2002, the roadway was in good-to-fair condition with minimum cracking. One longitudinal crack extended through the entire 9.6 miles of roadway. It was located on both sides of the road where the concrete slab ends and the asphalt-widening unit extends. Figure 3 shows the longitudinal crack and the current condition of some of the roadway. Prior to the placement of the concrete overlay, the "floating" asphalt section was milled down to be replaced with a full 8 in. PCC slab.

Figure 3. Longitudinal cracking and current condition of the roadway

Soil Conditions

According to the Iowa County Soil Survey Report, Clyde-Floyd Complex and Kenyon Loam are the primary soil associations that occur along the project. Clyde-Floyd Complex is deposited in

the drainage ways of glacial uplands. This association is poorly drained with moderate permeability, slow runoff, and high water capacity. Its low strength and wetness make it a poor road fill soil. Kenyon Loam is deposited along ridge tops and upland side slopes. This association drains moderately well and has moderate permeability, medium runoff, and high water capacity. Its low strength makes it a fair road fill soil. Table 4 details the American Association of State Highway and Transportation Officials (AASHTO) classifications of the project soils.

Table 4. Soil names and AASHTO classifications of project soils

Station to Station		Soil Name and Class	AASHTO Classification
51+00	63+00	Waspie Loam	A-4
63+00	68+00	Saude Loam	A-6
68+00	72+00	Lawler Loam	A-6, A-7
72+00	75+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
75+00	80+00	Olin Fine Sandy Loam	A-2, A-4
80+00	84+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
84+00	92+00	Kenyon Loam	A-6
92+00	95+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
95+00	98+00	Kenyon Loam	A-6
98+00	101+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
101+00	117+00	Kenyon Loam	A-6
117+00	121+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
121+00	153+00	Kenyon Loam	A-6
153+00	166+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
166+00	174+00	Kenyon Loam	A-6
174+00	176+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
176+00	185+00	Kenyon Loam	A-6
185+00	197+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
197+00	199+00	Kenyon Loam	A-6
199+00	207+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
207+00	212+00	Kenyon Loam	A-6
212+00	215+00	Dickinson Fine Sandy Loam	A-4, A-2
215+00	220+00	Olin Fine Sandy Loam	A-2, A-4
220+00	229+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
229+00	232+00	Rockton Loam	A-4
232+00	262+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
262+00	267+00	Kenyon Loam	A-6
267+00	271+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
271+00	280+00	Kenyon Loam	A-6
280+00	283+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
283+00	287+00	Kenyon Loam	A-6
287+00	299+00	Clyde–Floyd Complex	Clyde A-7, Floyd A-6, A-7
299+00	307+00	Kenyon Loam	A-6
307+00	310+00	Clyde-Floyd Complex	Clyde A-7, Floyd A-6, A-7
310+00	313+00	Olin Fine Sandy Loam	A-2, A-4
313+00	314+00	Clyde-Floyd Complex	Clyde A-7, Floyd A-6, A-7
314+00	316+00	Olin Fine Sandy Loam	A-2, A-4
316+00	319+00	Chelsea Loamy Fine Sand	A-2-4

Table 4. (continued)

Station to Station		Soil Name and Class	AASHTO Classification
319+00	322+00	Clyde-Floyd Complex	Clyde A-7, Floyd A-6, A-7
322+00	325+00	Basset Loam	A-4, A-6
325+00	328+00	Colo-Ely Complex	Colo A-4, A-6, Ely A-7, A-6
328+00	329+00	Downs Silt Loam	A-4, A-6
329+00	332+00	Colo-Ely Complex	Colo A-4, A-6, Ely A-7, A-6
332+00	341+00	Downs Silt Loam	A-4, A-6
341+00	344+00	Fayette Silt Loam	A-4, A-6
344+00	347+00	Colo-Ely Complex	Colo A-4, A-6, Ely A-7, A-6
347+00	356+00	Downs Silt Loam	A-4, A-6
356+00	359+00	Colo-Ely Complex	Colo A-4, A-6, Ely A-7, A-6
359+00	370+00	Downs Silt Loam	A-4, A-6
370+00	375+00	Colo-Ely Complex	Colo A-4, A-6, Ely A-7, A-6
375+00	377+00	Dickinson Fine Sandy Loam	A-4, A-2
377+00	380+00	Lamont Fine Sandy Loam	A-2, A-4
380+00	382+00	Colo-Ely Complex	Colo A-4, A-6, Ely A-7, A-6
382+00	386+00	Basset Loam	A-4, A-6
386+00	389+00	Kenyon Loam	A-6
389+00	396+00	Colo-Ely Complex	Colo A-4, A-6, Ely A-7, A-6
396+00	405+00	Basset Loam	A-4, A-6
405+00	413+00	Fayette Silt Loam	A-4, A-6
413+00	416+00	Clyde Clay Loam	A-7
416+00	422+00	Sparta Loamy Fine Sand	A-2, A-4
422+00	431+00	Fayette Silt Loam	A-4, A-6
431+00	457+00	Clyde-Floyd Complex	Clyde A-7, Floyd A-6, A-7
457+00	458+00	Dickinson Fine Sandy Loam	A-4, A-2
458+00	461+00	Burkhardt - Saude Complex	Burkhardt A-2, A-4, Saude A-6
461+00	476+00	Kenyon Loam	A-6
476+00	488+00	Clyde- Floyd Complex	Clyde A-7, Floyd A-6, A-7
488+00	495+00	Olin Fine Sandy Loam	A-2, A-4
495+00	498+00	Clyde-Floyd Complex	Clyde A-7, Floyd A-6, A-7
498+00	504+00	Kenyon Loam	A-6
504+00	507+00	Clyde-Floyd Complex	Clyde A-7, Floyd A-6, A-7
507+00	510+00	Kenyon Loam	A-6

Design Traffic

The portion of Iowa Highway 13 under research serves primarily as a farm-to-market road and as a connector road for traffic going from U.S. Highway 20 to Iowa Highway 3. Private residences and a few intersections of lightly traveled county roads exist along the project. No commercial or industrial sites are present to create large changes in traffic counts or uneven directional distribution. The average annual daily traffic is 2,930 vehicles per day (Iowa DOT), with 11% of those vehicles classified as trucks as of April 30, 2002.

CONSTRUCTION

The Iowa Highway 13 project consists of concrete widening and resurfacing. The previous driving surface was a 24 ft. wide ACC surface. At the completion of the current construction phase, the roadway surface is 28 ft. wide with an 8 in. thickened edge on the outer 5 ft. of each side. A thin concrete surface spans the middle 18 ft. Figure 4 shows the constructed cross-section for Iowa Highway 13.

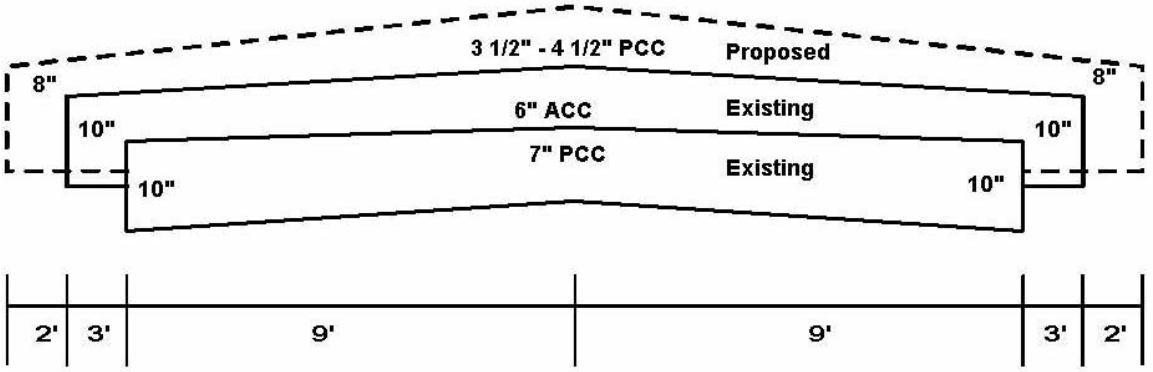

Figure 4. Typical cross section for the Iowa Highway 13 project

Scarification of the asphalt surface from station 51+00 to station 208+00 was performed two months prior to the thin whitetopping. The goal of the scarification was to remove the top layer, ¼ in. of oils and road grime, to create a surface that the concrete would bond to easily. A 6 ft. wide Wirtgen 900 DC milling machine was used to remove the upper ACC layer. The milling machine followed the crown of the road and completed the work in four passes. Debris from the scarification was transported and piled onto the shoulder using a loading belt mounted to the front of the milling machine. Figure 5 shows a typical scarified pavement surface on Iowa Highway 13.

The scarification of the previously described section was completed in two days, after which the milling of the asphalt widening unit began. The outer 3 ft. of the asphalt widening unit was removed in order to bring the roadway back to the original 18 ft., which has a concrete base underneath. The depth of the milling varied from 3.5 to 4.5 in.—dependent upon the thickness of the concrete to be placed in the overlay—creating a consistent 8 in. thick edge each side of the roadway. The milling operation was followed by a motor grader that pushed the shoulder material into the ditch and created a stable surface for the slip-form paver tracks to be supported upon. Figure 6 shows a typical milled widening unit on Iowa Highway 13.

Figure 5. Scarified pavement surface

Figure 6. Completed widening unit milling operation

The culvert extensions and the profile survey both began one month before the placement of the thin whitetopping. The profile consisted of survey points every 25 ft. along the edges of the original 18 ft. pavement width and along the centerline, for surveying both the scarified and HMA stress relief sections (stations 51+00 to 374+00). The broomed section consisted of shots at the 18 ft. edges, the 1/4 points, and the centerline (stations 374+00 to 513+70). These shots were used to calculate grades, create an improved driving surface, and help control the quantity of concrete used.

The HMA stress relief layer was placed by River City Paving three weeks prior to placement of the whitetopping overlay. It consisted of a 1 in. lift of asphaltic concrete. It was completed in two passes over the course of one day. Figure 7 shows a typical HMA stress relief surface on Iowa Highway 13.

Figure 7. HMA stress relief layer

Longitudinal subdrains were installed two weeks prior to the overlay surface. The longitudinal subdrains were installed adjacent to the existing asphalt widening units, so that they would be covered by the new widening unit. Table 3 shows the stationing and indicates the side of the road of both the existing and the newly installed longitudinal subdrains.

In the broomed-only section of the project, a bridging technique was used determine the minimum amount of surface preparation that could be performed in order to obtain desirable overlay performance. Areas of the pavement existed that were in extremely poor condition, having multiple transverse cracks and extensive faulting. Six cracks with this degree of distress were bridged with #4 coated epoxy rebars stapled to the slab. The bars were 36 in. long and were placed every 30 in., perpendicular to and centered over the crack. Figure 8 shows the bars stapled to the slab before they were overlaid with concrete. Table 5 shows the stations at which the transverse cracks were tied in this manner.

Figure 8. Tied transverse crack

Table 5. Tied transverse crack locations

	1	2	3	4	5	6
Station	385+98	396+33	404+82	409+65	418+00	456+66

Due to the high number of changing variables being tested on this project, the Iowa State University staff created signs that alerted construction workers to changes in joint patterns and fiber inclusion, and marked the beginning and ending points of the tied outer joints. Figure 9 shows the labeling plates that were placed throughout the length of the project to signal changes.

Figure 9. Labeling plate

Paving operations took place from July 2 to July 23, 2002. After subtracting rain days and holidays, the 9 miles of paving was completed in twelve working days. The PCC mixes used were Quality Management Concrete (QMC) mixes designed by Fred Carlson Company.

Materials were stored, proportioned, and mixed at a portable central mix PCC plant located at the north end of the project, in Kuhlman's Quarry on the west side of Edgewood, Iowa. Agitator trucks and dump trucks transported the mix to the construction location. Power brooming was conducted just prior to the placement of the PCC. The brooming was done to remove loose pavement or contaminants on the ACC surface. Also prior to placement—in test sections that required it—the 18 ft. joints on either side of the pavement were tied with #4 epoxy coated steel bars 3 ft. long. These bars were stapled to the pavement at 30 in. intervals in an effort to connect the 8 in. widening unit to the thin, unbonded pavement. Figure 10 shows the bars stapled to the asphalt slab prior to being covered by concrete.

Due to the high daytime temperatures during the construction of this project, water was used to control the temperature of the ACC base. The Iowa State University staff monitored the temperature of the subbase with infrared temperature guns. When the base reached 100°F, the base was sprayed with water. The water was placed on the existing surface an adequate length in front of the slip-form paver so that by the time the paving train passed by, evaporation of standing water had already occurred and the pavement had cooled to a safe level.

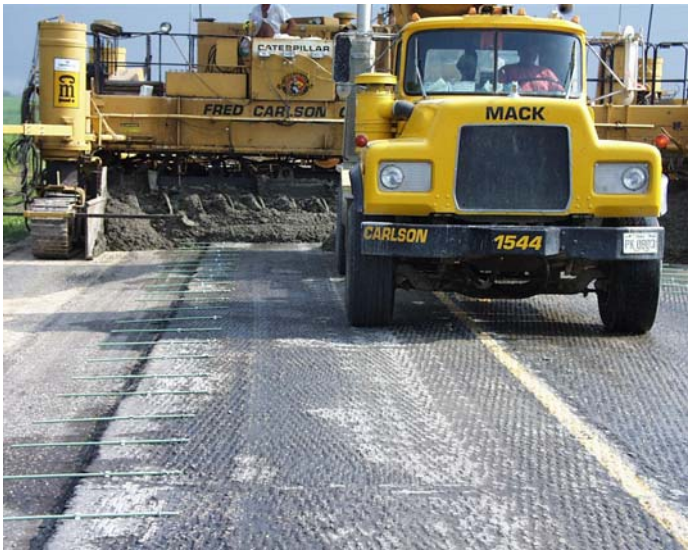

Figure 10. Stapled #4 bars that tie the widening unit to the thin overlay

A CMI Caterpillar SF-550 slip-form paver with electronic horizontal and vertical grade control was used to pave both lanes of the project simultaneously. Horizontally projected vibrators provided consolidation of the concrete. Following vibration, the PCC was struck off to achieve final thickness and a 2% crown. Attached to the bottom of the pan were two longitudinal joint forming knives. The knives separated the aggregates, leaving a weakened joint of concrete cream 2 in. deep. The knives were attached to each side of the pan, 9 ft. to the right and left of the centerline. The use of the longitudinal joint–forming knives on this project eliminated 17.5 miles of joint sawing. Figure 11 shows the longitudinal–joint forming knife as it was attached to the bottom of the pan.

Figure 11. Longitudinal joint–forming knife

After the paver, construction workers conducted initial texturing and bullfloating. The operators were followed by a Guntert and ZimmermanTC-850, which performed the longitudinal tining and sprayed the 1600-White curing compound on exposed portions of the slab. The outer 2.5 ft. of each side of the slab was not tined in order to create a natural shoulder appearance on the slab.

The sawing of joints began as soon as the concrete was set enough to support the equipment, typically 3 to 4 hours after the application of the curing compound. Sawing of the transverse joints continued until raveling occurred; at that time the operation was paused for 30 to 60 minutes to allow for more set time. The joints were cut in a way to form square panels of varying sizes—4.5 x 4.5 ft., 6 x 6 ft., and 9 x 9 ft. Figure 12 is a diagram that shows how the joint patterns were laid out on the slab.

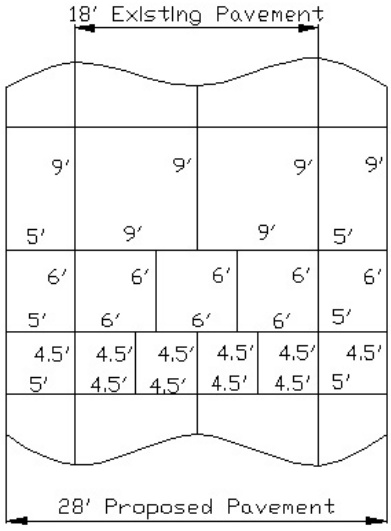

Figure 12. Typical panel sizes

Longitudinal joints were sawed 3 hours after the transverse joints, and they were sawed from south to north. The rate of placement required as many as three saws being used simultaneously in order keep up with the paving operation.

Since joints were ⅛ in. wide, they were cleaned but not sealed. The process of cleaning the joints consisted of a high-pressure air blast, which would drive the concrete dust out of the joint and off the slab.

Three varieties of synthetic fiber reinforcement were used on this project—polypropylene fibrillated, polypropylene monofilament, and structural fibers. All fibers on this project were provided by W. R. Grace. The fibers were added at rates of one pound of monofilament per cubic yard of concrete, three pounds of fibrillated polypropylene fibers per cubic yard of concrete, and three pounds of structural fibers per cubic yard of concrete. The fibers were blown into the concrete mixing drum by use of a hopper system supplied by W. R. Grace. Figure 13 shows the operation of the fiber inclusion system.

Figure 13. Fibers being blown into the concrete mixing drum

The strength development for this project was measured using the maturity method. Temperature probes were inserted 100 ft. from the end point of each test section. A 7.5 in. probe was inserted 1 ft. from the pavement edge and monitored the temperature at depths of 1, 4, and 7.5 in. Another probe was placed in the thin overlay section 6 ft. from the pavement edge to monitor the temperature at depths of 1 and 2 in. One set of probes was placed 100 ft. from the end of each of the 91 test sections. The temperature was read from these probes four times a day, Monday through Friday, to determine the time-temperature factor, which can be correlated to concrete flexural strength. The center portion of the new roadway was open to local traffic at a flexural strength of 350 psi, and construction traffic was allowed on the slab at 500 psi as determined by the maturity probes. The slab could have been opened to local traffic the day after it was placed; however, in an effort to protect the paving equipment and the workers, local traffic was not allowed on it until two days later.

A separate agreement was made with the Federal Highway Administration – Iowa Division to test multiple maturity devices on the same project. The objective was to provide an evaluation of

various types of maturity measuring equipment in a side-by-side demonstration of the materials and methods. A full report about the testing and evaluation of these devices is available upon request from the Principal Investigator.

Construction Concerns

Difficulties were encountered on numerous occasions in trying to reach a balance between preventing overrun, achieving the appropriate thickness, and maintaining a smooth ride. These problems were the result of the survey/grade not being finished prior to paving. The grades had to be calculated in a rush, not allowing time to input corrective measures in the design of the new roadway. In an effort to control the concrete overrun, the Iowa DOT lowered the grades; as a result, the ride quality, as measured by the profilograph, suffered.

The use of fibers caused concerns for construction workers who were trying to finish the slab, especially when using the structural fibers at the end-of-day joints. As a result, the fiber inclusion was stopped both in and out of the headers at the conclusion and the beginning of each day. If the paving was stopped in a test section that included fibers, the last two truckloads of the day were mixed without fibers. The same was true for the first two truckloads that were mixed in the morning. This change allowed for smoother headers and easier finishing.

Additionally, the tining process caused the fibers to stand up, making the surface of the slab look “hairy.” However, all of the surface fibers were worn away after a few days of highway traffic.

During the second day of paving, large concentrations of fiber were seen in the concrete. This was caused by a lack of suction in the blower which usually distributes the fibers evenly throughout the concrete in the mixing drum. To create more suction, a small cardboard piece was held over the opening of the blower after the fibers had been added. All clumps subsequently disappeared with use of the cardboard piece. Figure 14 shows how the cardboard piece was used to create increased blowing power.

Figure 14. Adjustment to blower for better fiber dispersion

In addition, excessive heat during construction was an issue. The 1 in. HMA stress relief layer that was placed over the existing asphalt retained a large amount of heat in the midday sun. Even after one application of water, the temperature of that surface was 120°F –130°F. Questions arose as to what effect the heat would have on bond between the slabs and the strength gain of the slab.

Also problematic was the wide gap that the longitudinal joint–forming knife left behind the paver. The resulting gap required extra passes from the workers using bullfloats to properly close it up. In a July 16, 2002 experiment, the joint forming knife on the right side of the pan was cut off at the back side of the pan. With that alteration, the aggregates were still being separated and the workers were able to properly close the gap in one pass. Due to the success of the experiment, the left knife was cut off at the back of the pan on the next day.

Some individual test sections experienced anomalies during the construction process. From station 81+00 to station 81+50, the right-side pad of the paver was stuck in the mud; as a result, the paver pivoted, bringing the left pad into the edge of the fresh concrete. The excess concrete during the pivot forced the paver pan upward, creating a bump. A great deal of handwork was required to finish the slab, which was particularly difficult because of the use of the structural fibers. From station 85+00 to station 96+00, a sudden rainstorm saturated the slab before it could be covered. The slab from 87+50 to 96+00 was able to be longitudinally tined and resprayed with curing compound. However, the slab from 85+00 to 87+50 was too set to re-tine and sustained visible damage to the surface. From 101+75 to 102+75, plant problems caused the concrete to sit in front of the paver for about one hour before operations resumed. After the plant was repaired, the concrete was sprayed with water and progress resumed.

Other construction concerns were quickly remedied, causing only minor delays. Additional concerns included rainstorms, depletion of fiber supply, and equipment breakdowns.

Field Changes

Since the fiber inclusion cannot be started and stopped immediately, it sometimes ran short or over the beginning or end of the test section. Table 6 shows the adjusted beginning and ending stations and which types of fibers were used.

During construction, questions were raised on the validity of blowing the concrete dust out of the joints after they had been sawed. Like the longitudinal joint–forming knife, the saw had already created a plane of weakness for the concrete to crack if needed. Since the joints were not going to be filled, the necessity of joint cleaning was questioned. As a result of these inquiries, the Iowa State University staff set out two test sections along the project to test the effects of not cleaning the joints. These test sections were located from 258+00 to 265+00 and from 495+00 to 513+66.

On the first day of paving, there was confusion between the specifications for the width of the concrete joints. As a result, the joints in the first and second day of paving were sawed with a

¼ in. blade instead of the specified ⅛ in. blade. The ¼ in. joints were not sealed and the problem was eliminated before the third day's paving was sawed. The ¼ in. blade was used from station 51+02 to station 97+35.

The original proposal had called for surface patching of rough areas as one of the asphalt surface preparations. This was not done because of the overall good condition of the existing asphalt surface. As a result, the sections that were identified to be surface patched were simply broomed prior to construction.

The original proposal had also called for the existing joint to be either bridged with concrete or cut to match the cracks of the base PCC layer. All of the joints on this project were bridged with concrete.

Table 6. Adjusted beginning and ending stations of fiber inclusion

Section	Station to Station		Length	Fiber Type
3-8	51+02	66+00	1,498	B
14	66+00	66+90	90	No
15-21	66+90	86+00	1,910	C
22-30	86+00	107+75	2,175	No
31-40	107+75	139+15	3,140	A
41	139+15	140+10	95	No
42-48	140+10	158+75	1,865	B
49	158+75	159+80	105	No
50-56	159+80	179+25	1,945	C
57-68	179+25	209+00	2,975	No
69-75	209+00	229+00	2,000	A
76	229+00	230+05	105	No
77-83	230+05	247+55	1,750	B
84	247+55	248+60	105	No
85-87	248+60	258+25	965	C
88-92	258+25	270+31	1,206	No
93	270+31	274+25	394	C
94-103	274+25	294+65	2,040	No
104-110	294+65	314+25	1,960	A
111	314+25	315+25	100	No
112-116	315+25	326+44	1,119	B
	326+44	326+44	0	Header – Two loads in and two out with no fibers
116-118	326+44	334+25	781	B
119	334+25	335+50	125	No
120-126	335+50	354+00	1,850	C
127-135	354+00	374+98	2,098	No
136-142	374+98	393+75	1,877	A
143	393+75	395+00	125	No
144-150	395+00	414+00	1,900	B
151	414+00	414+75	75	No
152-153	414+75	419+45	470	C
	419+45	419+45	0	Header – Two loads in and two out with no fibers
153-158	419+45	434+50	1,505	C
159-167	434+50	458+01	2,351	No
168-174	458+01	472+00	1,399	A
175	472+00	472+50	50	No
176-182	472+50	490+80	1,830	B
183	490+80	491+50	70	No
184-186	491+50	497+25	575	C – Ran out of C fibers
187-191	497+25	513+66	1,641	No

TEST FREQUENCY AND METHODS

Direct Shear Testing

The theory of the overlay design assumes that the PCC overlay will partially bond with the asphaltic concrete layers and the underlying PCC layer to form a composite section. This in turn will move the neutral axis of the composite section down into the asphaltic concrete layer and allow for the thin PCC overlay layer to perform well. It is important to characterize the bond between the various layers to confirm this theory.

The Iowa Direct Shear Method involves pushing the asphaltic concrete layer off the PCC layer at the interface and in a direction parallel to the interface on a concrete core. Three cores were obtained at each of twelve sites on this project, at three different time periods. The time periods represented include (1) immediately after construction, (2) at the midpoint of the research, and (3) at the end of the research period. In this case, the core locations were selected to represent the three types of base (asphaltic concrete) preparation. In addition, all cores were obtained in the 3.5 in. overlay depth to represent the most critical need for bond. The final criteria for the site selection included variances of slab size and fiber type used in the PCC. In each test period, cores were taken from the center of three consecutive panels in the outer wheel path of the given test section. Cores were tested in the laboratory, in accordance with Iowa DOT Office of Materials Test Method 406-C.

Load Transfer

Data collection of deflection data was accomplished biannually by crews from the Office of Special Investigations – Iowa DOT, using a Falling Weight Deflectometer (FWD). A single location in each test section was identified by the research team for testing. Care was taken to alternate sites between lanes of travel. The Iowa DOT crew tested each location, identified by a white painted rectangle, twice per year with the FWD.

Before construction, the original pavement structure was tested in the outer wheel path of the north and southbound lanes. Each location was tested once. After construction, the new pavement was tested in the same spots twice a year, once in October and once in April.

Testing is conducted by the Iowa DOT Ames Office using a Foundation Mechanics JILS-20-FWD with a 6 in. load plate and nine displacement measuring sensors. One transducer is located at the center of the load plate, and the remaining transducers are spaced at varying intervals from the plate. Figure 15 shows the location of the deflection sensors in relation to the load.

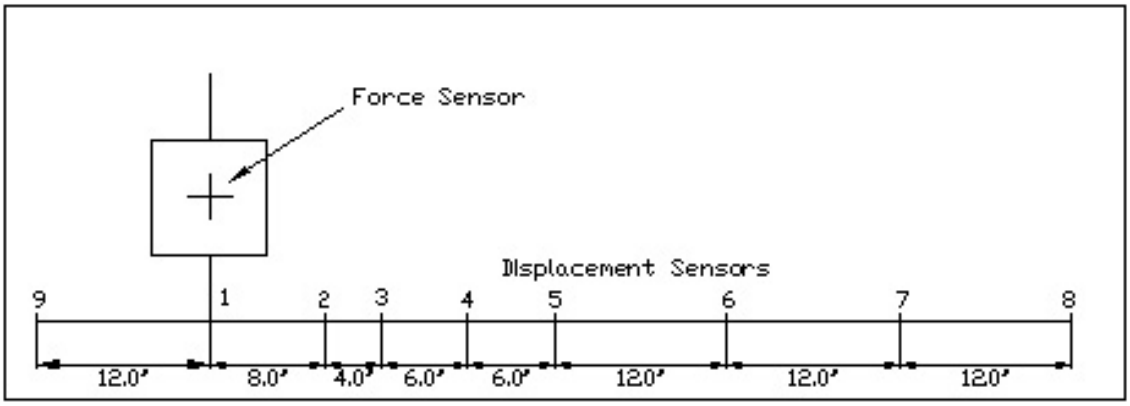

Figure 15. Schematic of FWD deflection sensors

The computer and system processor controlled testing operations and recorded maximum deflection responses measured by each transducer. At each of the test locations, drops were made at a target load of 9,000 lbs. A drop sequence was performed at each test location at the transverse joint and at the slab center along the outer wheel path. Appendix A contains load transfer data calculated from the FWD testing done before and after construction. Test locations were established to provide replicates of the test variable combinations and direction of travel. Testing locations are also indicated in Appendix A with the data.

Joint Openings and Faulting Measurements

During the construction process, nails were placed on each side of the transverse joints, 10 in. apart and 1 ft. from the edge of the northbound lane. Twice a year, the staff from Iowa State University measured the joint openings and the faulting of ten consecutive transverse joints located at the center of each test section. The distance between the nails was measured and recorded to determine the effects of the changing climate on the pavement surface.

The faulting is measured using a faultmeter at the same ten transverse joints that were measured for joint openings. The faulting is read 4.5 ft. from the outer edge of both the northbound and southbound lanes. Appendix B and Appendix C contain faulting data and joint opening data, respectively, that have been collected since construction.

Visual Distress Surveys

Since the construction of the project, visual distress surveys have been conducted. The types of distresses considered in the survey include transverse cracks, longitudinal cracks, corner cracks, diagonal cracks, fractured panels, and opening of the widening joint. Surveys are conducted twice per year, in October and in April. The tests are performed to identify the impact of the freeze thaw cycles and the impact of heavy loads on pavement performance.

Results from three visual distress walking surveys are inconclusive, but they do provide some insight into the long-range performance of overlay design features. Working centerline joints cannot be bridged with concrete up to 4.5 in. deep without expecting some reflective cracking. One such instance occurred in the first year in a 6 ft. wide panel that bridges the centerline.

In one area of the project, the existing ACC materials were almost completely removed to allow the new surface to meet an existing concrete road at an intersection. This was the tradeoff to removal of a large amount of relatively new county road approach PCC. This resulted in effectively building a bonded overlay in this short area. It is performing well, but care should have been taken to match new and existing joints. By continuing the normal joint pattern for the test section, we have observed one longitudinal centerline crack and two transverse cracks that reflect the underlying joint pattern.

Weigh-in-Motion Device Measurements

A weigh-in-motion device was installed at station 340+00. It records the number of axles and the weight of the axles that pass that particular point. The device monitored the traffic in both the northbound and southbound lanes. The data was used to identify reasons for differences in pavement performance. In this test site, the pavement loading was nearly equal in both directions.

Profile Data Collection

Profile data collection was performed biannually by crews from the Office of Special Investigations – Iowa DOT, using a high speed profiler. The profiler was operated in both the northbound and southbound lanes. Laser sensors on the profiler collected data from the inside and outside wheel paths in each direction.

DATA ANALYSIS AND RESULTS

Direct Shear Tests

The results of direct shear strength tests are shown below in Table 7. Each average value in the table represents the average of three cores. Where zeros appear, this is indication that the asphalt did not remain in contact with the PCC upon core removal or insufficient depth of asphaltic concrete remained to provide for a shear test. The results indicate a large variance in test values for all cores. This is typical of results from other such tests in Iowa and many of the national values. Visual review of the cores indicates that the weak point in the system occurs at an asphaltic concrete lift line 1 in. or more below the asphaltic concrete surface.

Table 7. Pavement variables and results of shear test

Station	Base Prep.	Depth (in.)	Fiber Type	Panel Size (ft. x ft.)	Shear Strength (psi)								
					October 22, 2002			June 25, 2004			April 11, 2006		
					Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.
58+00	Scarify	3.5	B	6	207	180	194	120	0	50	100	0	33
73+00	Scarify	3.5	C	6	200	156	180	200	100	153	120	0	40
98+00	Scarify	3.5	None	6	200	152	176	210	50	130	0	0	0
115+00	Scarify	3.5	A	4.5	204	150	179	270	220	240	130	0	43
215+00	HMA S.R.	3.5	A	4.5	203	153	178	170	90	130	0	0	0
235+00	HMA S.R.	3.5	B	4.5	158	120	138	120	0	77	0	0	0
271+00	HMA S.R.	3.5	C	9	197	110	158	120	80	103	0	0	0
281+00	HMA S.R.	3.5	None	4.5	153	139	145	150	70	100	0	0	0
376+00	Patch	3.5	A	4.5	475	282	352	190	160	170	140	0	47
401+00	Patch	3.5	B	4.5	264	211	229	140	100	117	510	300	390
426+00	Patch	3.5	C	6	460	290	370	140	80	110	370	340	350
436+00	Patch	3.5	None	4.5	270	228	256	80	70	73	180	140	153

During the course of the research, the team decided to install temperature and strain gages in the concrete to aid in the development of a design procedure for thin PCC overlays. The results from cores taken in those areas are shown in Table 8. These values show much higher average shear strength than those shown in Table 7. This could indicate that the test results relate to the skill used in coring the test samples and could relate to the pavement temperature and conditions at the time of coring.

Table 8. Pavement variables and results of shear test at strain gage locations

Strain Gage Test Site	Station	Base Prep.	Depth (in.)	Fiber Type	Panel Size (ft. x ft.)	Shear Strength (psi)		
						May 27, 2004		
						Max.	Min.	Avg.
1	439+25	Patch	3.5	None	4.5	410	400	403
2	444+25	Patch	3.5	None	6	280	210	243
3	495+00	Patch	4.5	C	9	440	150	273
4	500+00	Patch	4.5	None	4.5	430	240	347
5	507+10	Patch	4.5	None	6	440	350	387

Faulting

Collection of faulting data twice annually at ten joints in each direction for each test section resulted in a large amount of test data. It did provide the research team with data that could be analyzed by direction of travel, location, or within given test variables. Analysis of the traffic data indicated very little or insignificant differences in loading of the pavement by direction. With this in mind, the research team decided to average the faulting measurements in both directions for a given section and average the values between sections with the same overlay depth, base preparation, fiber type and joint spacing, for a given test period. Graphs and tables representing this data over time were developed and reviewed visually. They are included in Appendix B. All faulting values were normalized to 70°F for comparison.

Assuming that the sections without fiber in the overlay represent the default value in this research, the following conclusions can be drawn from the data:

- Faulting was measured to the nearest 0.1 mm (0.004 in.) with the accuracy of the FHWA faultmeters, or to the nearest 1.0 mm (0.04 in.) with the Gilson faultmeters. Considering instrumental and human accuracy in placing the faultmeters, faulting values in each survey period of the project are considered to be zero for pavement operational purposes.
- Over the research period, the faulting range in the 3.5 in. overlay without fibers ranged from -0.04 to +0.05 in. for 4.5 ft. panels, and it ranged from -0.03 to 0.06 in. for the 6.0 ft. panels. In the 4.5 in. overlay without fibers, the faulting ranged from -0.04 to +0.05 in. for 4.5 ft. panels and -0.04 to +0.04 in. for 6.0 ft. panels.
- All data plots for faulting result in a sinusoidal pattern with values moving from positive to negative to positive to negative over the research period.
- Adding fibers to the 3.5 in. overlay mix resulted in faulting ranges of -0.04 to +0.05 in. for type A fibers and -0.08 to +0.03 in. for type B fibers in the 4.5 ft. panels. In the 6.0 ft. panels, the faulting ranged from -0.09 to +0.05 in. for type A, -0.05 to +0.04 in. for type B, and -0.04 to +0.04 in. for type C fibers. In the 9.0 ft. panels, faulting ranged from -0.04 to +0.04 in. with the inclusion of type C fibers.
- Adding fibers to the 4.5 in. overlay mix resulted in faulting ranges of -0.04 to +0.04 in. for type A and -0.05 to +0.05 in. for type B fibers in the 4.5 ft. panels. In the 6.0 ft. panels, the faulting ranged from -0.04 to +0.03 in. for type A fibers, -0.04 to +0.05 in. for

type B fibers, and -0.04 to +0.05 in. for fiber C inclusion. In the 9.0 ft. panels, the faulting ranged from -0.04 to +0.07 in. with the inclusion of the fiber C.

- Panel size did not provide any appreciable differences in faulting measurements.
- The net result of adding the fibers had no significant impact on the level of faulting.
- In terms of overlay depth, faulting did not indicate a significant difference between 3.5 and 4.5 in. of depth.
- The type of surface preparation—such as scarification, asphaltic concrete stress relief layer, or patching—was also considered in the analysis. In terms of faulting, scarification and patching provided nearly equal performance while adding the stress relief layer resulted in more variance in faulting and higher maximum/minimum values in both overlay depths.
- Historical wisdom would drive the researcher to expect larger faulting values as the panel size and depth of overlay increase. However, the results of this research do not support that theory. Test sections for each panel size exhibited some large variations in faulting over time, and the ranges of faulting values were almost identical, as shown above.

Joint Movement

The field testing of joint opening was carried out at the same time the faulting measurements were taken. The data was averaged in the same manner as the faulting data. In some test sites, reference pins were not installed due to low manpower availability. These sites were omitted from this calculation. Graphs and tables representing this data over time were prepared and visually analyzed. These are included in Appendix C. All values in these graphs and tables have been normalized to 70°F for comparison.

Measurements were taken between two surveyors' nails at each joint. The nail spacing was approximately 10.0 in. The indentation in the nail head was designated as the location where the points of the digital caliper were set. The caliper provided values of 0.01 mm (0.0004 in.) accuracy. The readings that were taken immediately after construction served as the baseline distance between a given set of nails. The values shown in the graphs represent the difference between the baseline value and the distance between points at the time of a given survey. This also represents the amount of additional opening of the joint (+ value) or closing of the joint (- value) at the time of survey as compared to the baseline values.

Assuming that the sections with no fiber introduced into the overlay represent the default value in this research, the following conclusions can be drawn from the data:

- The data produced an anomaly in the results for the survey conducted in the spring of 2006. This variance is consistent between survey staff and over the course of two days of surveying. No apparent reason for the inconsistency has been found, and the spring 2006 results are not included at this time in the subsequent statements on joint opening.
- Joint opening changes in the 3.5 in. overlay without fiber ranged from -0.11 to +0.08 in. for the 4.5 ft. slabs and -0.05 to +0.15 in. for the 6.0 ft. slabs. In the 4.5 in. overlay, the values ranged from -0.10 to +0.15 in. for the 4.5 ft. slabs and -0.10 to +0.10 in. for the 6.0 ft. slabs.

- All data plots for joint openings resulted in a sinusoidal pattern with values moving from positive to negative to positive to negative over the research period. The pattern is similar to that of the faulting values, although the range is much smaller.
- Adding fibers to the 3.5 in. overlay mix resulted in a range of values from -0.10 to +0.40 in. of movement with fiber A, -0.11 to +0.41 in. with fiber B, and -0.12 to +0.41 in. with fiber C in the 4.5 ft. panels. In the 6.0 ft. panels, the faulting ranged from -0.10 to +0.41 in. for fiber type A, -0.18 to +0.41 in. for fiber B, and -0.31 to +0.10 in. for fiber C inclusion. Values ranged from -0.32 to +0.48 in. for fiber C in the 9.0 ft. panels.
- Adding fiber to the 4.5 in. overlay mix resulted in faulting ranges of -0.05 to +0.40 in. with type A and -0.05 to +0.48 in. with type B fibers for the 4.5 ft. panels. In the 6.0 ft. panels, the joint opening values varied from -0.20 to +0.41 in. with fiber A and -0.09 to +0.41 in. with fiber B. Joint opening changes ranged from -0.02 to +0.41 in. for the type C fiber sections with 9.0 ft. joint spacing.
- Adding the fibers to the mix had no significant impact on the level of joint opening. There was no difference in the impact of the fiber types A, B, or C on the results.
- Panel size did not provide any appreciable difference in load transfer for the first 3.5 years of the project.
- In terms of overlay depth, joint opening values did not indicate a significant difference between 3.5 and 4.5 in. of depth.
- The type of surface preparation—such as scarification, asphaltic concrete stress relief layer, or patching—was also considered in the analysis. In terms of joint openings, scarification and patching provided nearly equal performance, while adding the stress relief layer resulted in more variance in joint opening and higher maximum/minimum values in the 3.5 in. overlay. In the 4.5 in. overlay, patch preparation provided the least amount of movement, followed by the scarification; addition of the stress relief layer triggered a greater amount of movement than the other two types of surface preparation.
- This data did not indicate the differences that might have been anticipated in joint openings over time. Basically, all joints moved very little for the first 3.5 years.

Load Transfer

Load transfer values were calculated by the deflection method. The percent load transfer is equal to the deflection on the leave side of the joint, divided by the deflection of the loaded approach side of the joint, then multiplied by 100. The deflections relating to the 9,000 lb. load were used in the analysis. Test sections were grouped according to their overlay depth, base preparation, fiber type, and joint spacing, for a given test period. The data were displayed in table and graphs and visually analyzed. See Appendix A.

Target values of 75%–100% indicate a very good aggregate–interlocking load transfer for an overlay of this type that has no joint reinforcement. Assuming that the sections with no fiber introduced into the overlay represent the default value in this research, the following conclusions can be drawn from the data:

- Load transfer in the 3.5 in. overlay without fiber ranged from 80% to 99% in the 4.5 ft. slabs and 80% to 95% in the 6.0 ft. slabs. One value of over 100% was recorded, but it is

assumed to be a data collection equipment error. In the 4.5 in. overlay, the values ranged from 77% to 100% for the 4.5 ft. slabs and 75% to 100% for the 6.0 ft. slabs. The sections in both overlay depths that exhibited values near 75% were investigated and show no apparent reasons for the low values; values increased on the same sections over time.

- Adding fibers to the 3.5 in. overlay mix resulted in a range of load transfer values from 80% to 100% with fiber A and 55% to 95% with fiber B in the 4.5 ft. panels. In the 6.0 ft. panels, the load transfer ranged from 65% to 100% for fiber type A, 70% to 100% for type B, and 70% to 95% for type C inclusion. In the 9.0 ft. panels, values ranged from 55% to 100% for fiber C load transfer sections. No apparent reasons were noted for the individual sections with low load transfer values. Values moved back into acceptable ranges in successive tests. Fiber C load transfer did seem sensitive to testing date, exhibiting very high spring values and lowest values in the fall.
- Adding fiber to the 4.5 in. overlay mix resulted in load transfer ranges of 80% to 100% with fiber type A and 75% to 100% with fiber B for the 4.5 ft. panels. In the 6.0 ft. panels, load transfer varied from 87% to 95% with fiber type A and 85% to 95% with fiber B. One section exhibited a single value in excess of 100% for one test, indicating an equipment malfunction. Load transfer varied from 80% to 100% for the type C fiber sections with 9.0 ft. joint spacing. One test in one of the fiber C sections indicated a load transfer of 40%, although values were in excess of 80% on all other tests. The research team attributes this value to a data collection machine error.
- Adding fibers to the mix had no significant impact on the values of load transfer or variation over time. There was no difference in the impact of fiber types A, B, or C on the results. Each fiber exhibited similar variations and maximum/minimum values for individual tests.
- Panel size did not provide any appreciable difference in load transfer values for the first 3.5 years of the project.
- In terms of overlay depth, load transfer was not affected by the difference in overlay thickness.
- The type of surface preparation—such as scarification, asphaltic concrete stress relief layer, or patching—was also considered in the analysis. In terms of load transfer, scarification provided the best performance. Patching and addition of the stress reliever layer provided good performance, but each technique yielded individual sections that did not perform as well as the scarified sections. Both these base preparations are more prone to variation in the surface's ability to bond with the concrete overlay. Similar results were noted in both overlay depths.
- Load transfer values remained constant over time and varied only where specific testing problems existed in a single section for a single test period.

Visual Distress Survey

The data collected during the visual distress surveys considered the following types of distress: transverse cracks, longitudinal cracks, corner cracks, diagonal cracks, and cracking of the widening joint. When a distress was present in a test section, its type, location, and the number of panels affected were recorded. The percentage of panels affected was determined for each type

of distress and then graphed by the pavement variables within a test section. Tables and graphs representing these results are located in Appendix D.

Assuming that the sections with no fiber introduced into the overlay represent the default value in this research, the following conclusions can be drawn from the data:

- With the exception of the widening joint, the percentage of cracked slabs remained within the range of 0.0%–3.0%.
- Cracking distress at the widening joint can be attributed to the method in which the joint was placed.
- Depth of overlay and the addition of fibers did not contribute to the amount of visual distress in the pavement.
- Considering the type of base preparation, scarification and patching contributed the least amount of distress, resulting in 0%–2% distressed panels. The hot mix stress relief layer produced no cracking in the 4.5 ft. panels, but cracking was in the 5% range in the 6 ft. panels.
- Cracking at the widening joint resulted in the highest percentage of distress, ranging from 20% to 30% cracked adjacent overlay slabs. In areas where the joint was tied, no cracking occurred.

Weigh-in-Motion

Data recorded by the weigh-in-motion device shows the number and weight of axles that passed its location at station 340+00. The data was then analyzed using the program VTRIS 6.0 to produce the number of average daily Rigid ESALS. These values were then totaled on a yearly basis, and the results can be seen in Table 9. For additional data, see Appendix E.

Table 9. Total yearly rigid ESALS

Year	Rigid ESALS		
	Northbound Lane	Southbound Lane	Average
2002*	39,260	40,698	39,979
2003	62,689	67,457	65,073
2004	138,801	144,405	141,603
2005	151,194	157,457	154,326
2006*	46,363	50,968	48,666
Total ESALS	438,307	460,985	449,646

* indicates partial year

Profile IRI Values

Field testing with the high speed profiler produced data from the inside and outside wheel paths for both the northbound and southbound lanes. This data was then entered into the profile program ProVAL 2.6 to produce the IRI values for each test section. A 250 mm moving filter

was applied to the raw data, removing small imperfections such as texture in order to simulate how a tire would feel on the pavement . Since traffic data indicated an insignificant difference in the loading condition between lanes, the IRI values were averaged for inside and outside wheel paths instead of direction. Average values were graphed by depth, base preparation, fiber type, and panel size, and then visually analyzed. These graphs and tables are included in Appendix F.

Assuming that the sections with no fiber introduced into the overlay represent the default value in this research, the following conclusions can be drawn from the data:

- IRI values remained in the range of 115–125 in. per mile.
- The 3.5 in. depth produced higher IRI values than the 4.5 in. depth, which is typical of a thicker slab. A thicker slab will reduce the amount of faulting in an overlay, resulting in lower IRI values.
- The 4.5 ft. panel size did not result in an increased IRI when compared to the larger 6 ft. or 9 ft. panel.
- A tied centerline resulted in lower IRI values for the inside wheel path when compared to the outside wheel path.

Soil Classification

The design for this overlay project assumed that the soils present coincided with the Iowa Delaware County Soil Survey. The research team took soil borings from the final constructed road shoulder and performed a visual classification to verify the finding of the soil survey. Locations of the cores were determined from pavement variables and distresses in the overlay. The results of the visual classification verified the accuracy of the soil survey except when organic matter was present. This could be an indication of the presence of fill material. Results of the visual classification are shown in Appendix G.

CONCLUSIONS

Shear tests

- Shear values declined over time in each of the sections tested, but did retain an adequate level of bonding.
- Shear values are relatively insensitive to base preparation at the time of construction.
- Bond value retention was greatest in base preparations of (1) cleaning and patching and (2) scarification. Retention was lowest with the addition of the asphaltic concrete stress relief layer.
- Special care in determining appropriate coring weather and selecting operators is necessary to achieve reliable values in bond strength.

Faulting

- Faulting values tend to move in a sinusoidal manner over time for given slab configurations.
- Scarification or patching base preparations perform better than stress relief layer preparations over time.

Joint Opening

- Joint opening values tend to move in a sinusoidal manner over time for given slab configurations.
- Neither panel size nor overlay depth made a significant difference in joint movement.
- Increased variance in joint movement was noted in the stress reliever base preparation areas, over that in the scarification or patch areas.

Load Transfer

- Load transfer was constant across overlay depths, fiber types and joint patterns.
- Load transfer can vary from test to test when the overlay is placed on patched areas or stress reliever layers. Stress reliever layer load transfer values appear to increase over time as the layers bond together.
- Scarification of base layers appears to provide the most consistent load transfer values, with patching and stress relief layers in close conformity.

IRI

- IRI values were less than desirable due to the way the grade line was established for paving.
- Using smaller sized panels did not contribute to increased IRI values when compared to the use of larger panels.

Distress

- Tying the widening joint to the overlay resulted in zero longitudinal cracking at this joint. All other sections exhibited some type of cracking associated with the use of the longitudinal joint former.
- Longitudinal cracking appears where the longitudinal joint is placed near or in the wheel path.

- Corner cracking was the predominate source of distress from a research standpoint. It amounted to 1%–2% of the slabs with any given set of variables.

Overall

- The project is performing well.
- Overlay depths of 3.5 in. or greater can be built without the use of fiber inclusion.
- Adding fibers to overlay depths of 4 in. or less will provide insurance against loss of materials in the event of an individual slab loss-of-support and multiple cracking.
- Structural fibers can provide an opportunity for larger slab sizes without loss of load transfer or increased cracking rates in overlays of 4.5 in. or less.
- Minimal scarification of the base asphaltic concrete surface is shown to be the most efficient way to control overlay quantities, assure proper cross slope, and minimize overlay thickness design while placing additional concrete in the rutted areas of existing surface.
- Three isolated areas in an outer wheel path sustained fractured slabs and loss of up to 1–4 panels over the course of the research. The panels were replaced with hand methods and concrete repair materials supplied by the Maintenance Staff of the Iowa DOT. Joints were reestablished, and the patches are performing well at this time. No common variables were demonstrated in the three separate areas, and it can be noted that the fibers in the concrete did control loss of section when the concrete cracked.
- This project has shown that maintenance personnel with normal materials and equipment can maintain the concrete surface when isolated panels fail under this design system.
- The wider joint openings at the beginning of the project have collected more particle debris, but they exhibited no distress at the end of the research period.
- Test segments where sawing dust was not removed performed equally to those where joints were cut and blown clean.
- The results of this project and two others in Iowa indicate that a design process now exists to provide engineers with a portland cement concrete answer to pavement rehabilitation needs. All that remains is implementation and use.

RECOMMENDATIONS

Shear Testing

- Develop a protocol for testing the environment and handling materials to reduce variation in the results.

Faulting

- Review the relationships between faulting, panel size, and overlay depth for this type of overlay.

Joint Openings

- Future work should employ a more precise method of measuring joint openings, allowing for positive set of the caliper points and resisting salt action on the surface. This type of analysis should measure consecutive joints (3 or more) over the course of 72 hours or more to understand the relationship between the panel size and the joint movements.

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APPENDIX A: LOAD TRANSFER DATA

Table A.1. Load transfer data for overlays 3.5 in. thick

Fiber Type	Panel Size	Surface Prep.	Section	Station		Load Transfer, %						
				Beg.	End	Fall 02	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
A	4.5	Scarify	33	113+50	119+50	93.64	91.92	90.86	91.48	98.28	96.77	92.54
		HMA S. R.	69	209+00	213+00	92.38	91.23	90.58	90.54	99.60	97.40	91.35
			71	214+00	218+00	91.35	96.32	92.65	97.12	97.06	94.25	91.75
		Patch	136	375+00	379+00	89.33	n/a	93.47	79.95	97.20	91.89	93.42
			138	380+00	384+00	90.84	92.93	90.38	91.56	98.55	89.92	90.73
	6.0	Scarify	31	107+00	113+00	77.83	60.62	91.04	70.22	95.30	94.58	86.34
		HMA S. R.	73	219+00	223+00	91.44	93.84	91.53	93.74	98.74	97.32	86.49
			75	224+00	228+00	65.23	75.54	90.50	81.24	95.14	69.85	87.75
		Patch	140	385+00	389+00	91.62	95.60	90.44	91.25	98.11	95.40	92.94
			142	390+00	394+00	94.24	96.53	93.75	94.52	97.44	96.43	92.23
B	4.5	Scarify	9	52+00	56+00	90.15	89.97	91.30	91.73	97.38	94.91	89.48
		HMA S. R.	77	229+00	233+00	93.73	97.50	93.23	92.73	98.25	97.99	55.41
			79	234+00	238+00	83.81	86.59	73.50	96.20	87.59	71.89	94.64
		Patch	144	395+00	399+00	91.00	95.11	89.23	90.58	98.32	95.86	90.89
			146	400+00	404+00	93.39	94.25	89.80	93.67	98.65	93.97	92.29
	6	Scarify	13	62+00	66+00	91.56	79.40	90.21	90.76	96.93	94.33	89.77
		HMA S. R.	81	239+00	243+00	91.92	92.33	89.73	92.90	97.81	89.96	89.41
			83	244+00	248+00	93.77	91.45	88.27	84.28	93.96	87.29	89.12
		Patch	148	405+00	409+00	88.10	70.02	77.80	78.17	99.85	82.12	91.76
			150	410+00	414+00	94.65	92.61	91.81	89.72	96.33	96.24	93.40
C	6	Scarify	17	72+00	76+00	92.34	93.61	93.17	91.59	98.26	96.18	92.91
			21	82+00	86+00	82.61	75.90	84.50	72.31	95.12	84.90	86.36
		Patch	152	415+00	419+00	85.58	78.02	79.15	85.51	94.04	80.08	91.36
			154	420+00	424+00	92.41	90.00	93.10	90.18	98.07	93.07	92.65
			156	425+00	429+00	87.84	81.23	79.77	87.94	98.06	92.33	91.10
			158	430+00	434+00	93.33	95.01	92.58	92.41	99.04	96.74	87.89
	9	HMA S. R.	85	249+00	253+00	91.30	92.37	92.35	95.30	97.77	86.79	88.38
			87	254+00	258+00	93.75	54.27	91.18	56.26	96.49	76.34	94.46
			91	265+00	269+00	92.80	86.41	92.07	85.07	99.00	69.88	89.32
			93	270+00	274+00	n/a	89.20	92.14	81.54	100.17	97.48	92.09
No	4.5	Scarify	25	92+00	96+00	92.03	93.68	92.73	91.85	97.73	96.54	89.43
		HMA S. R.	95	275+00	279+00	96.17	98.74	94.75	95.06	98.92	144.21	94.47
			98	280+00	284+00	93.21	94.36	93.72	92.31	99.62	94.79	88.73
		Patch	160	435+00	439+00	82.27	28.48	88.64	81.79	98.21	90.25	95.06
			162	440+00	444+00	98.03	99.81	95.05	96.43	98.51	108.10	98.47
		Remove	89	259+75	263+25	88.25	84.03	87.30	90.97	97.98	91.03	88.38
	6	Scarify	29	102+00	106+00	91.74	82.39	89.16	90.98	97.54	96.10	89.61
		HMA S. R.	100	285+00	289+00	91.67	95.83	93.82	92.24	98.68	95.81	94.81
			102	290+00	294+00	89.77	82.73	89.90	88.65	98.13	95.53	90.72
		Patch	164	445+00	449+00	88.76	93.93	93.30	93.07	90.34	83.22	94.97
			166	450+00	454+00	91.00	95.30	90.60	92.92	99.09	95.60	93.41

Table A.2. Load transfer data for overlays 4.5 in. thick

Fiber Type	Panel Size	Surface Prep.	Section	Station		Load Transfer, %						
				Beg.	End	Fall 02	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
A	4.5	Scarify	34	120+00	124+00	95.11	99.04	95.39	97.25	98.68	95.04	93.15
			36	125+00	129+00	94.36	95.29	91.47	91.99	98.45	96.51	91.63
		HMA S. R.	104	295+00	299+00	94.35	97.07	94.09	93.59	98.25	95.07	95.28
			106	300+00	304+00	96.48	95.08	92.62	82.99	99.49	96.43	95.39
		Patch	168	455+00	459+00	94.56	98.44	93.90	93.10	101.43	94.51	95.58
			170	459+50	463+50	93.49	97.49	91.11	92.22	98.09	94.93	92.89
	6	Scarify	38	130+00	134+00	94.44	99.58	94.95	93.53	97.90	95.18	86.73
			40	135+00	139+00	91.56	80.84	91.53	91.45	98.47	96.68	93.70
		HMA S. R.	108	305+00	309+00	90.74	88.61	93.86	97.48	98.65	89.80	94.13
			110	310+00	314+00	91.44	92.05	91.69	91.11	98.02	93.91	92.29
		Patch	172	464+00	468+00	94.24	96.38	94.51	93.07	98.72	94.95	95.50
			174	468+50	472+50	94.35	93.73	93.56	91.78	97.99	94.76	94.76
B	4.5	Scarify	42	140+00	144+00	92.83	96.71	93.68	89.14	97.86	94.17	92.03
			44	145+00	149+00	94.95	96.68	91.14	91.89	98.88	97.09	95.69
		HMA S. R.	112	315+00	319+00	93.68	97.63	94.70	94.39	98.63	95.85	95.49
			114	320+00	324+00	93.65	94.01	92.03	95.80	97.57	96.15	93.69
		Patch	176	473+00	477+00	96.39	92.88	95.56	97.04	100.40	93.29	96.18
			178	477+50	481+50	87.61	75.09	84.78	75.31	97.29	94.21	85.13
	6	Scarify	46	150+00	154+00	89.92	93.83	93.87	93.50	96.73	132.75	89.26
			48	155+00	159+00	94.57	87.11	91.50	91.07	96.82	93.73	n/a
		HMA S. R.	116	325+00	329+00	90.04	93.03	92.12	90.74	97.06	88.85	85.86
			118	330+00	334+00	94.74	94.62	93.29	90.30	97.23	95.99	92.16
		Patch	180	482+00	486+00	92.79	94.63	93.51	99.15	84.42	83.23	91.09
			182	486+50	490+50	97.50	98.74	96.57	95.91	98.72	92.13	93.77
C	9	Scarify	50	160+00	164+00	91.42	89.29	95.38	90.84	99.58	n/a	92.95
			52	165+00	169+00	87.37	90.97	91.35	90.99	97.61	96.52	92.15
			54	170+00	174+00	77.33	75.73	82.29	45.24	95.71	90.63	89.31
			56	175+00	179+00	90.59	89.44	93.53	93.73	98.64	98.16	95.14
		HMA S. R.	120	335+00	339+00	93.55	95.28	94.10	98.03	99.04	93.10	94.93
			122	340+00	344+00	87.37	78.69	87.94	76.76	99.53	92.69	93.88
			124	345+00	349+00	95.97	97.28	95.94	88.48	101.03	95.58	95.13
			126	350+00	354+00	92.91	93.39	92.14	90.25	98.63	78.27	91.92
		Patch	184	491+00	495+00	95.12	93.09	93.82	95.91	100.96	97.55	96.43
			186	495+50	499+50	94.72	96.45	92.89	89.46	99.57	93.16	78.48
No	4.5	Scarify	61	189+00	193+00	93.84	91.76	92.73	92.79	98.49	97.63	89.56
			63	194+00	198+00	80.24	88.93	88.64	95.64	95.81	93.17	93.10
		HMA S. R.	128	355+00	359+00	94.69	97.32	92.80	94.01	99.23	95.01	93.57
			130	360+00	364+00	94.89	93.53	94.09	92.96	99.83	93.80	94.16
		Patch	189	500+50	506+60	94.23	95.67	92.56	93.77	98.71	94.31	94.58
	6	Scarify	65	199+00	203+00	93.86	80.91	91.93	93.28	98.61	97.65	89.60
			67	204+00	208+00	92.45	96.72	88.24	99.51	98.13	95.16	88.77
		HMA S. R.	132	365+00	369+00	93.73	96.78	91.83	95.29	98.56	95.56	93.65
			134	370+00	374+00	90.65	75.06	91.02	93.68	99.79	94.50	90.75
		Patch	191	507+60	513+70	93.11	92.41	91.74	94.74	99.03	91.46	94.02
		Remove	59	183+75	186+75	88.41	85.41	89.32	103.30	97.66	91.76	91.05

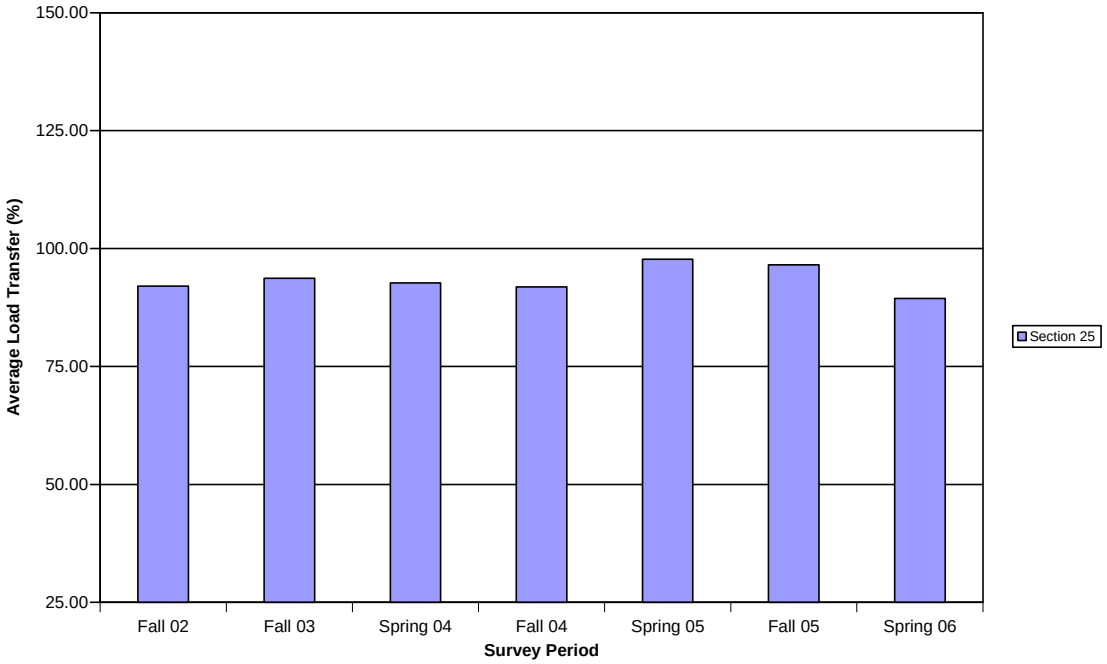

Figure A.1. Load transfer, 3.5” depth, scarify, no fibers, 4.5’ panel

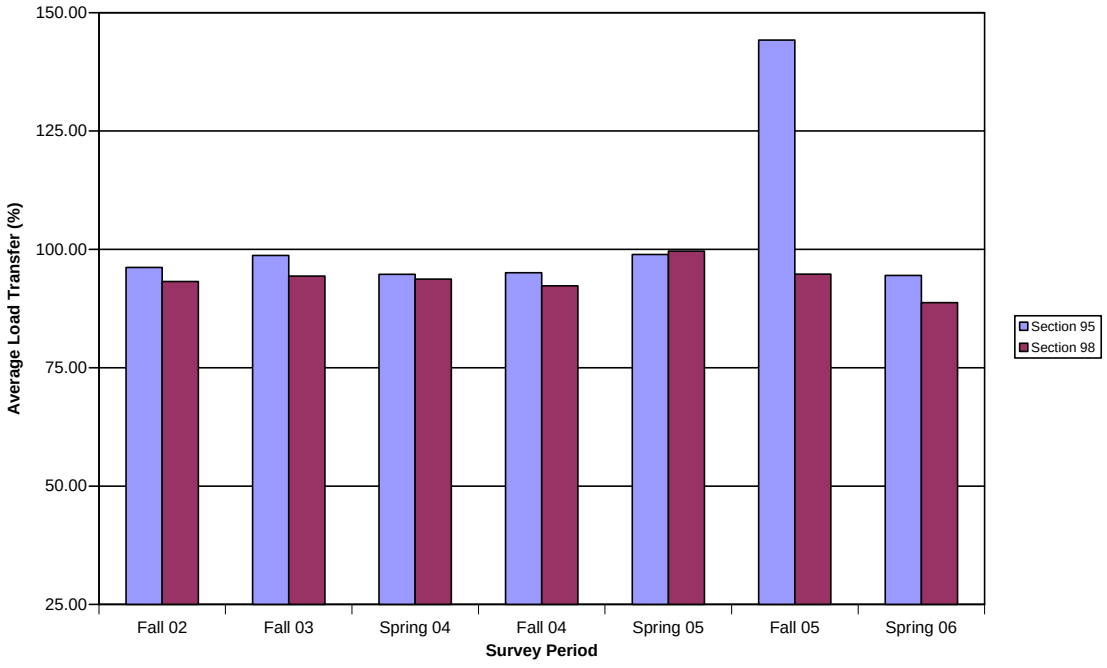

Figure A.2. Load transfer, 3.5” depth, HMA S. R., no fibers, 4.5’ panel

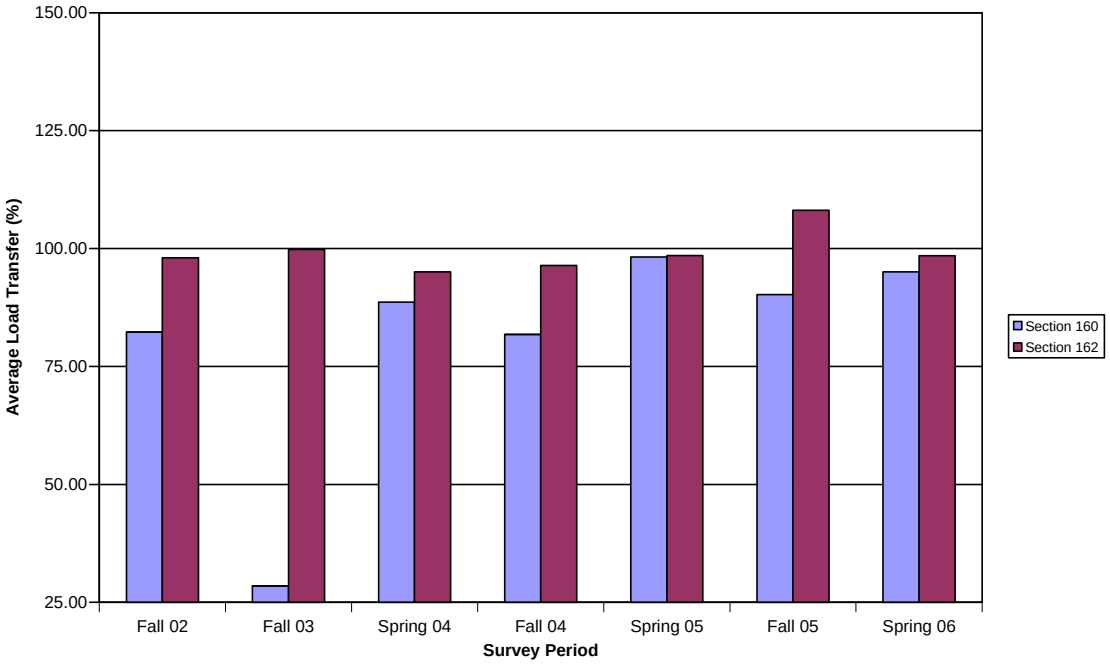

Figure A.3. Load transfer, 3.5” depth, patch, no fibers, 4.5’ panel

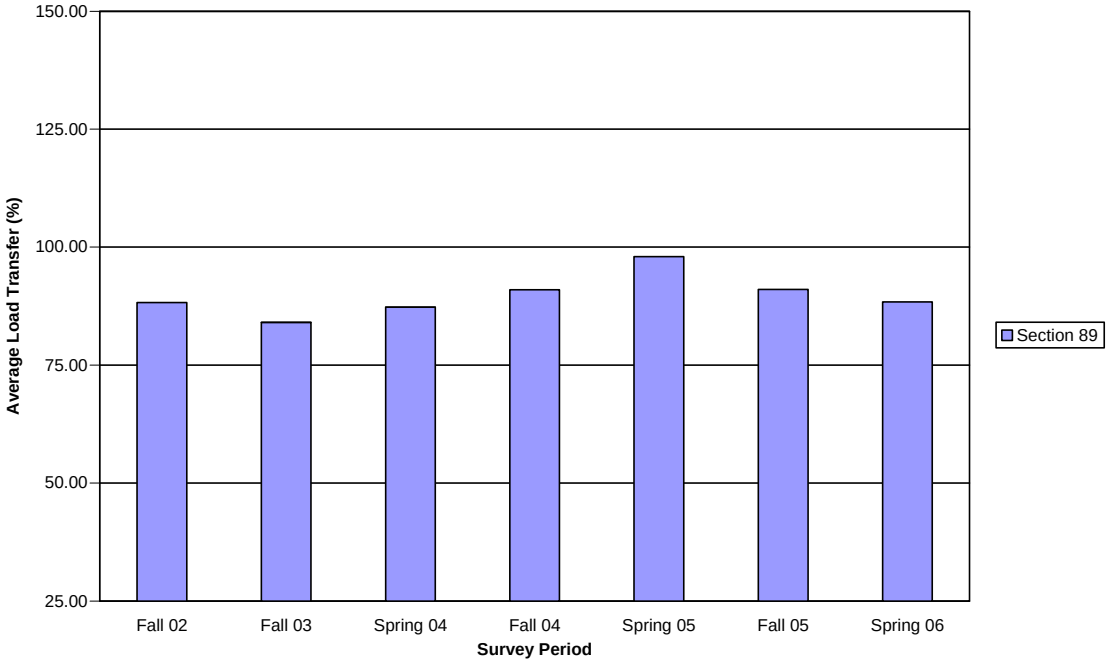

Figure A.4. Load transfer, 3.5” depth, remove, no fibers, 4.5’ panel

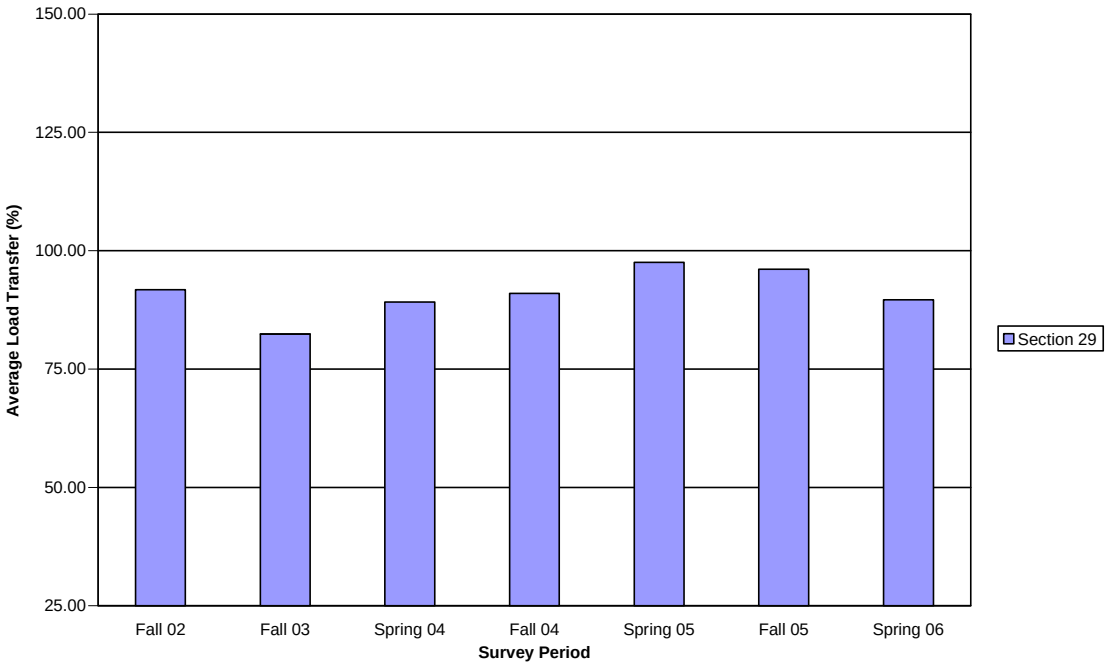

Figure A.5. Load transfer, 3.5” depth, scarify, no fibers, 6’ panel

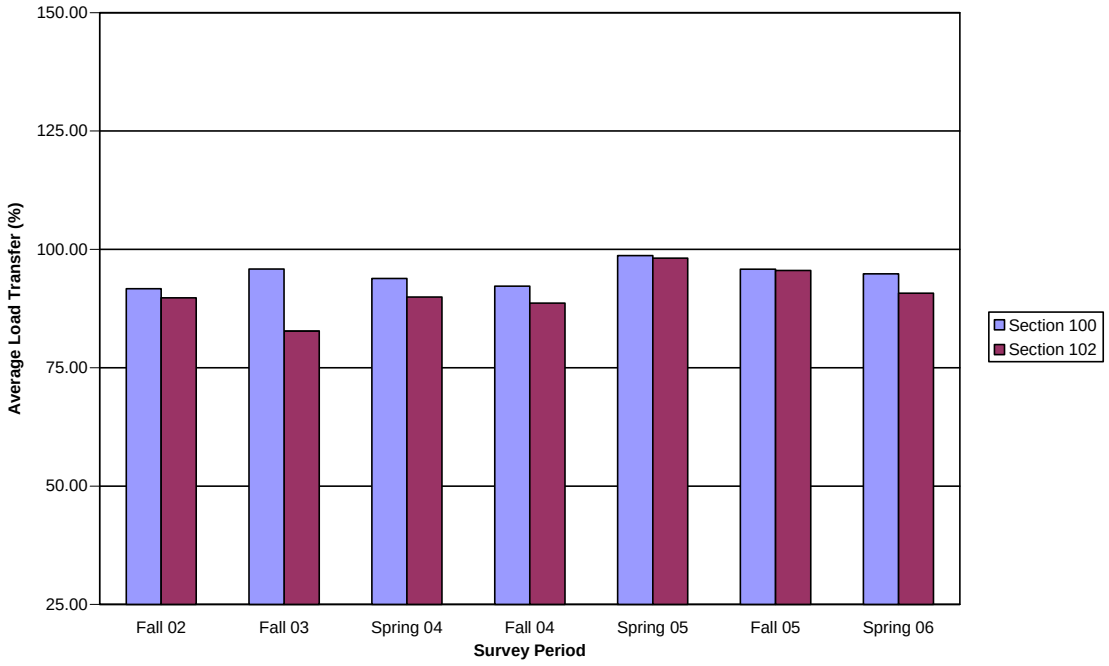

Figure A.6. Load transfer, 3.5” depth, HMA S. R., no fibers, 6’ panel

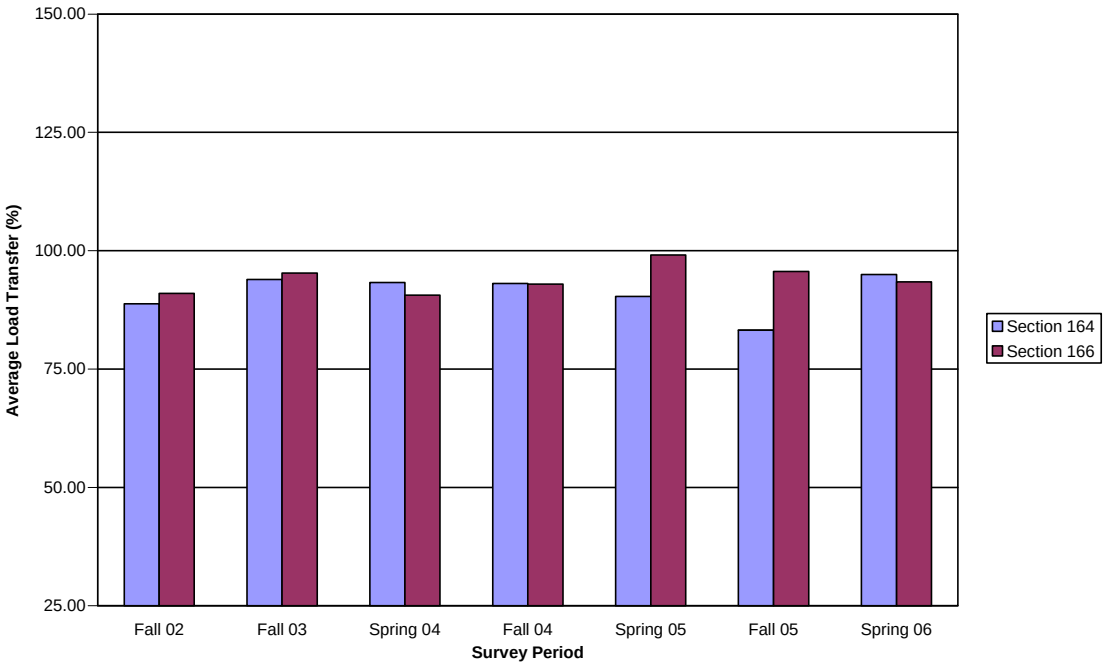

Figure A.7. Load transfer, 3.5” depth, patch, no fibers, 6’ panel

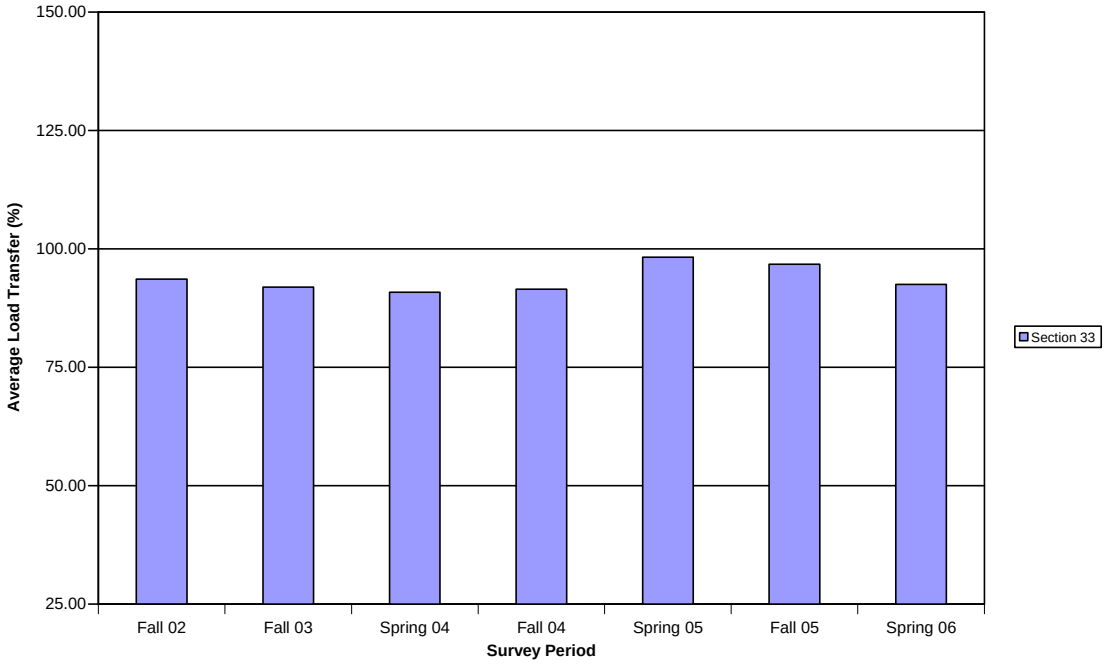

Figure A.8. Load transfer, 3.5” depth, scarify, fiber A, 4.5’ panel

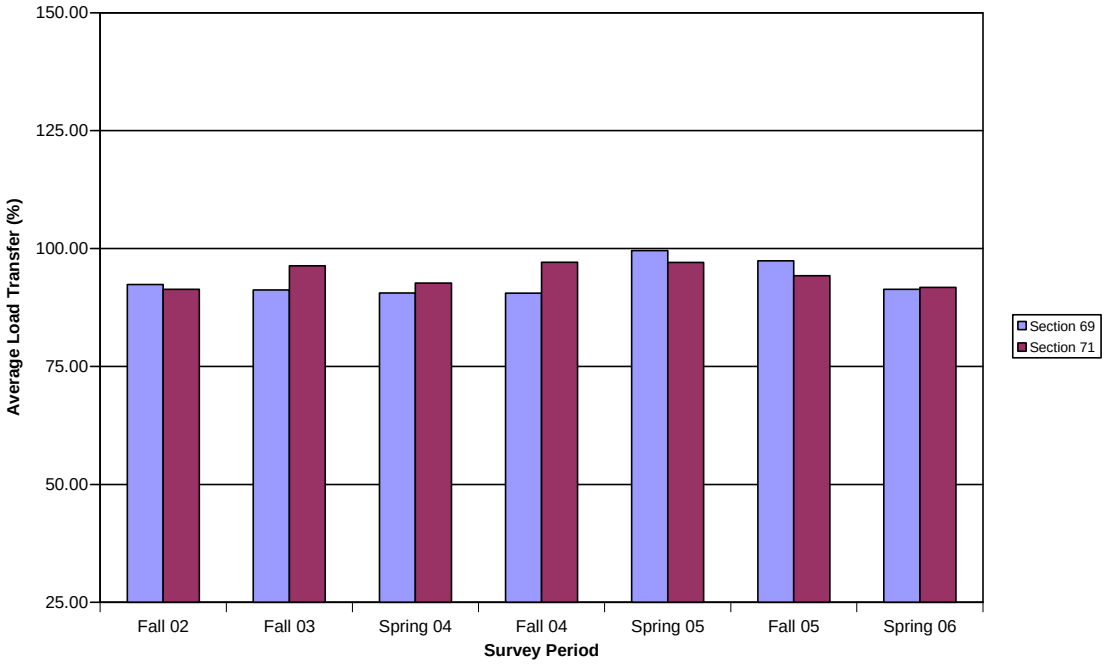

Figure A.9. Load transfer, 3.5” depth, HMA S. R., fiber A, 4.5’ panel

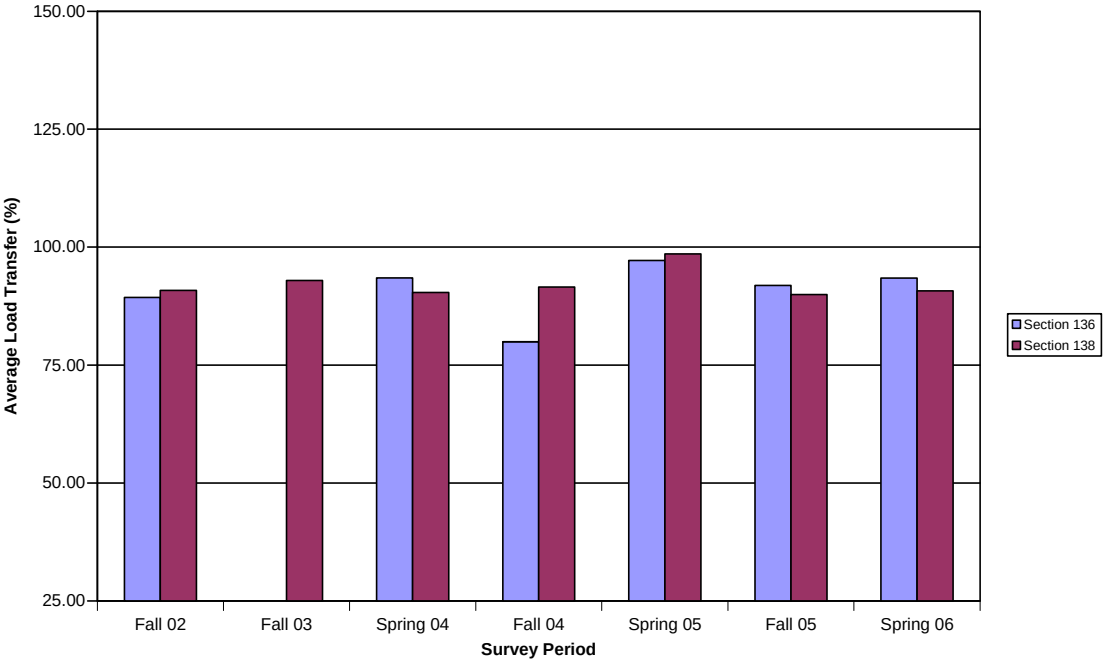

Figure A.10. Load transfer, 3.5” depth, patch, fiber A, 4.5’ panel

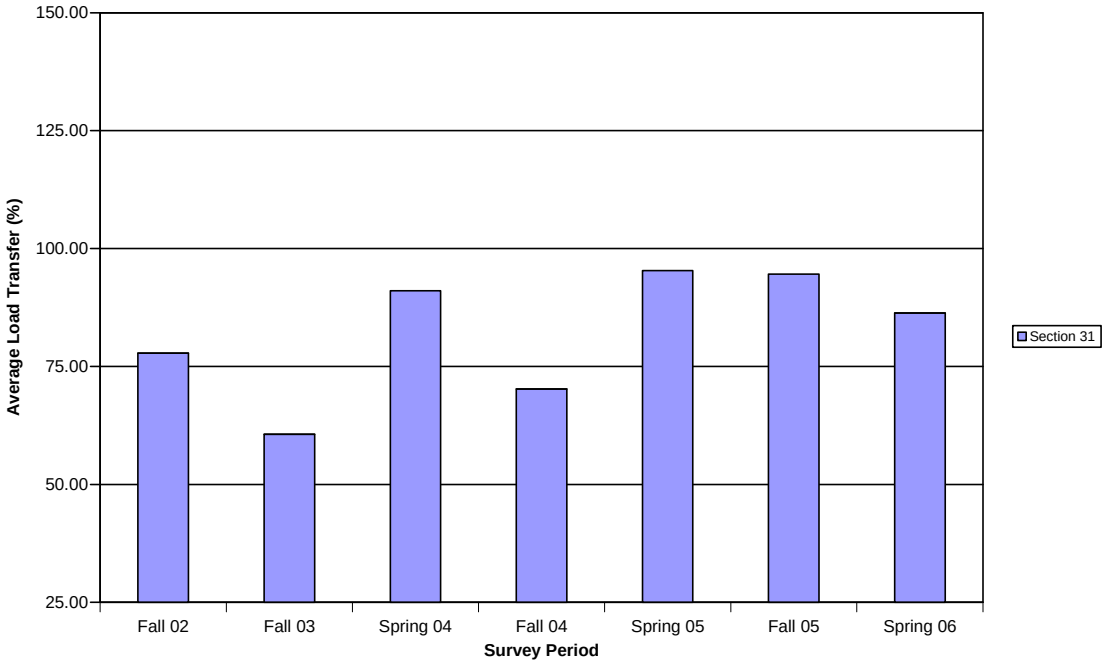

Figure A.11. Load transfer, 3.5” depth, scarify, fiber A, 6’ panel

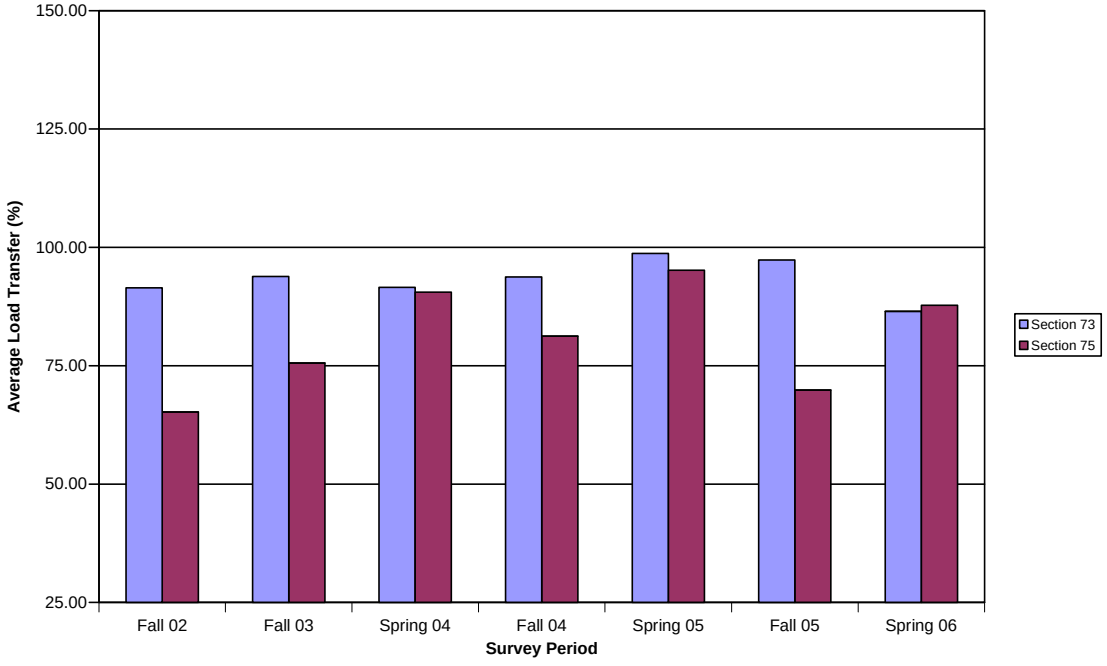

Figure A.12. Load transfer, 3.5” depth, HMA S. R., fiber A, 6’ panel

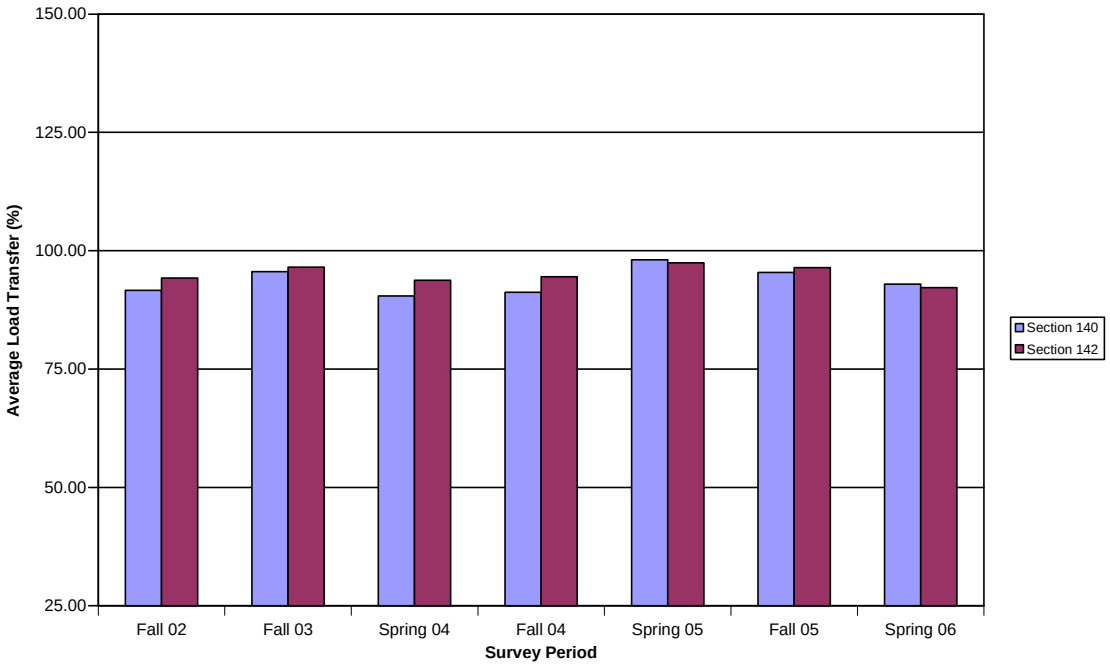

Figure A.13. Load transfer, 3.5” depth, patch, fiber A, 6’ panel

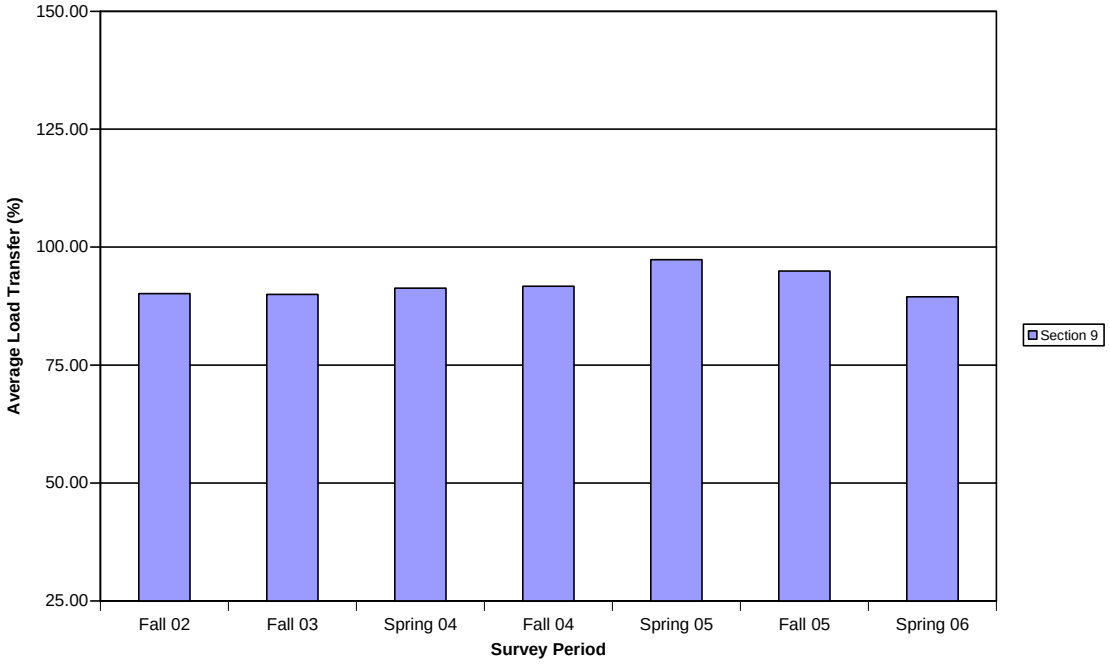

Figure A.14. Load transfer, 3.5” depth, scarify, fiber B, 4.5’ panel

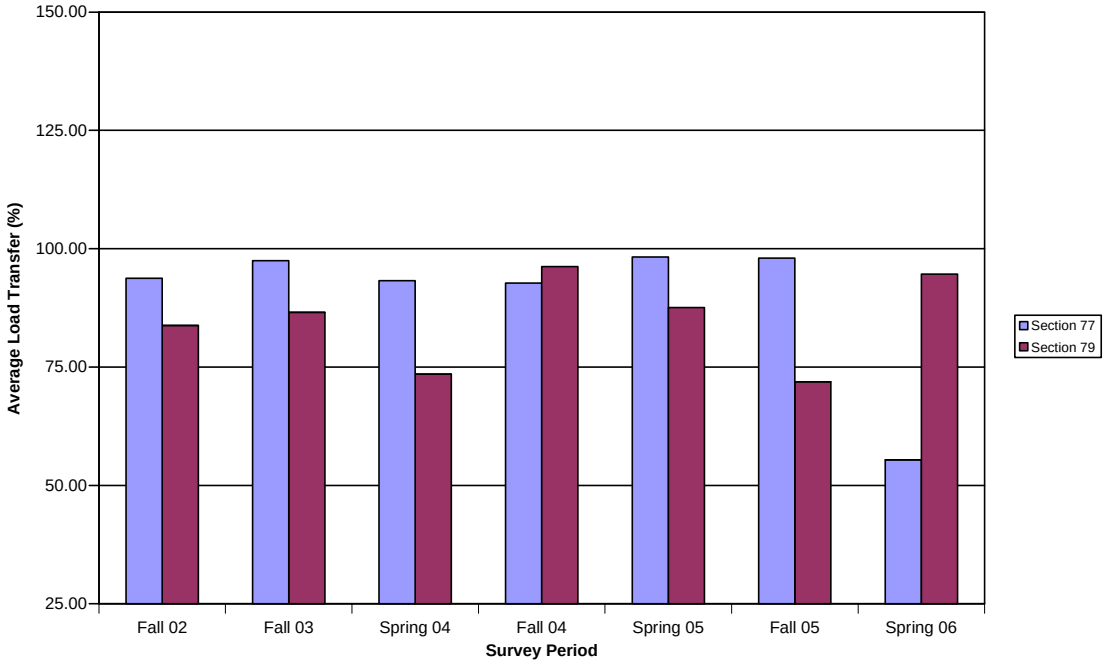

Figure A.15. Load transfer, 3.5” depth, HMA S. R., fiber B, 4.5’ panel

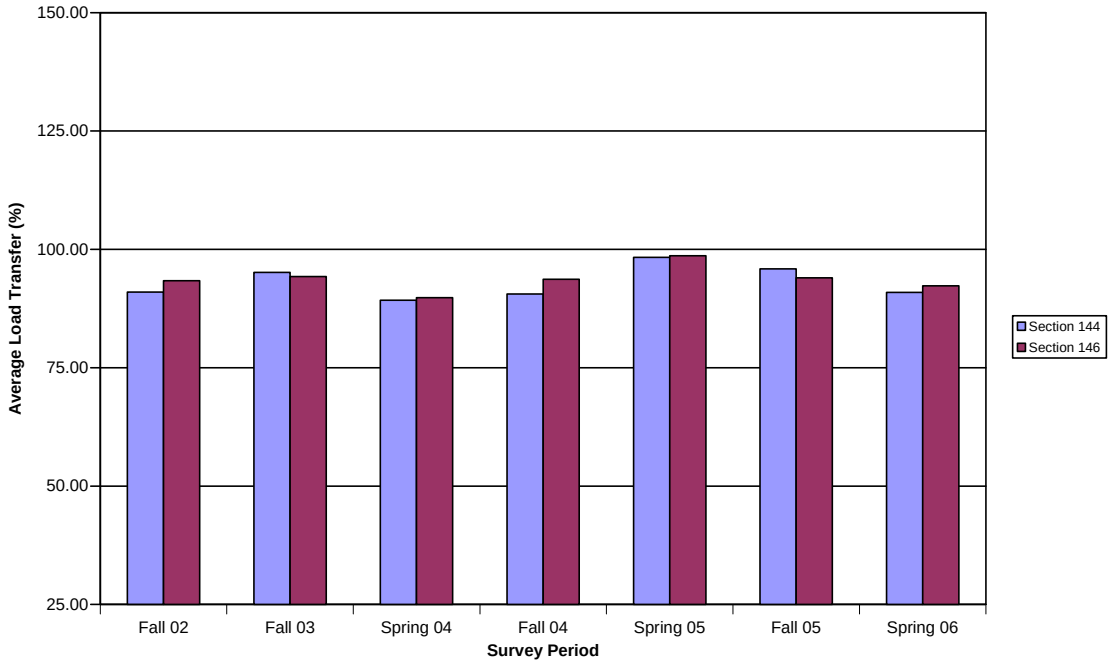

Figure A.16. Load transfer, 3.5” depth, patch, fiber B, 4.5’ panel

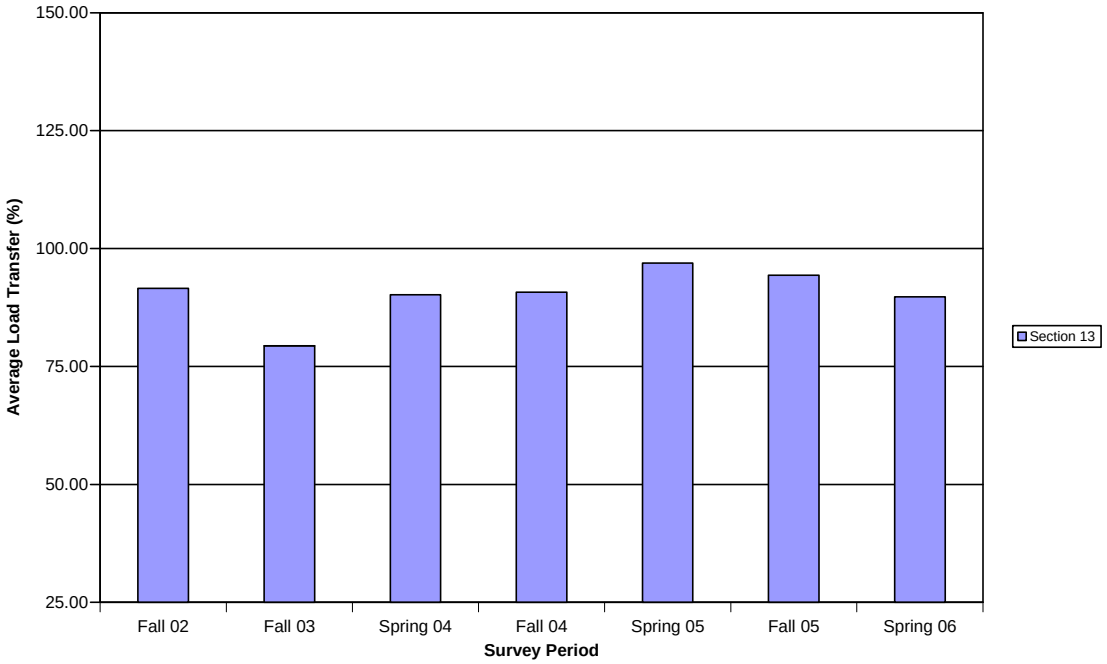

Figure A.17. Load transfer, 3.5” depth, scarify, fiber B, 6’ panel

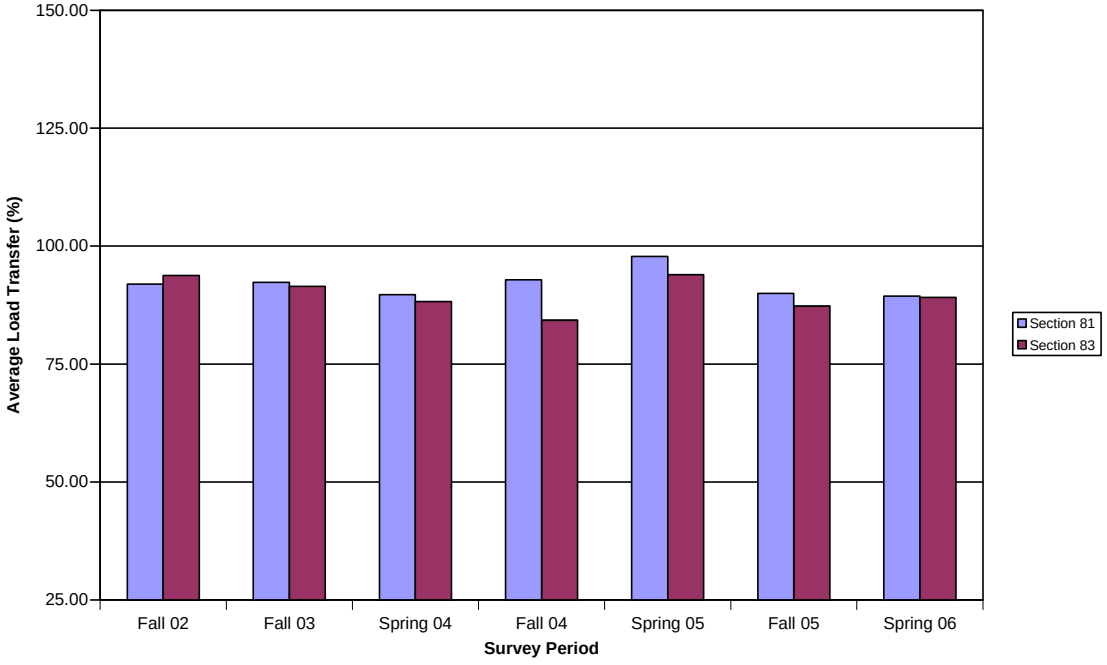

Figure A.18. Load transfer, 3.5” depth, HMA S. R., fiber B, 6’ panel

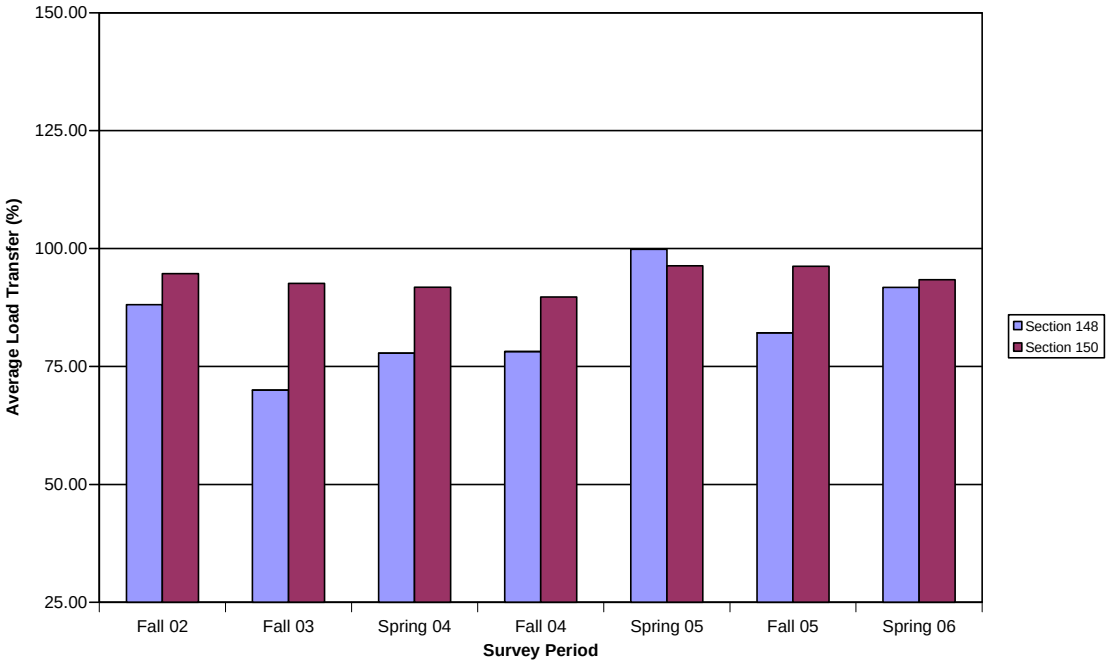

Figure A.19. Load transfer, 3.5” depth, patch, fiber B, 6’ panel

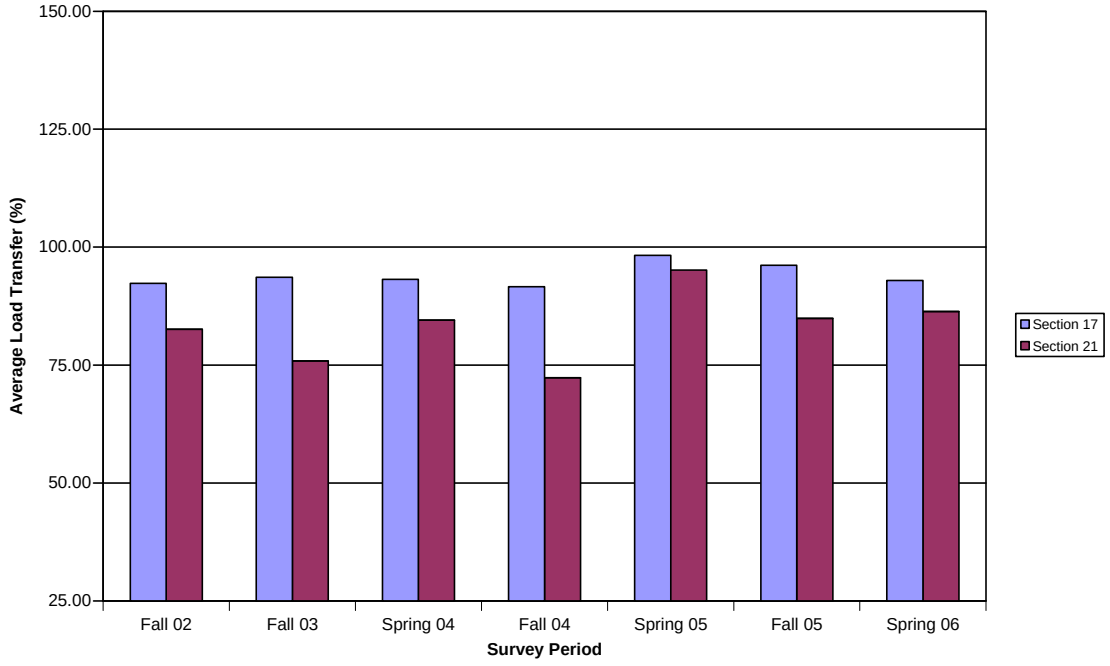

Figure A.20. Load transfer, 3.5” depth, scarify, fiber C, 6’ panel

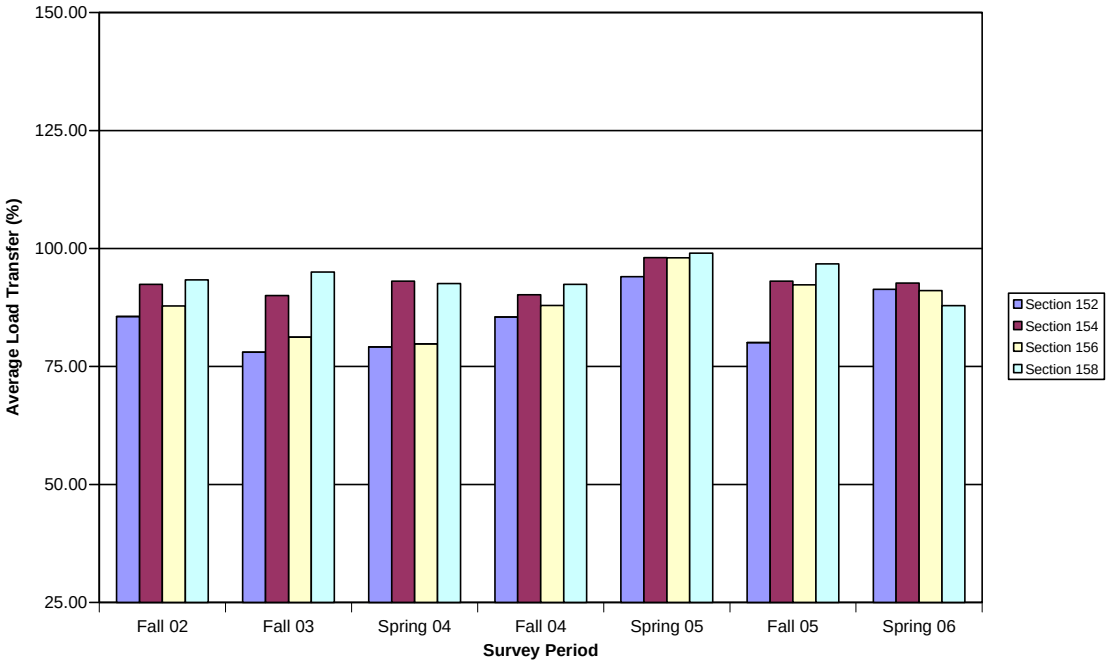

Figure A.21. Load transfer, 3.5” depth, patch, fiber C, 6’ panel

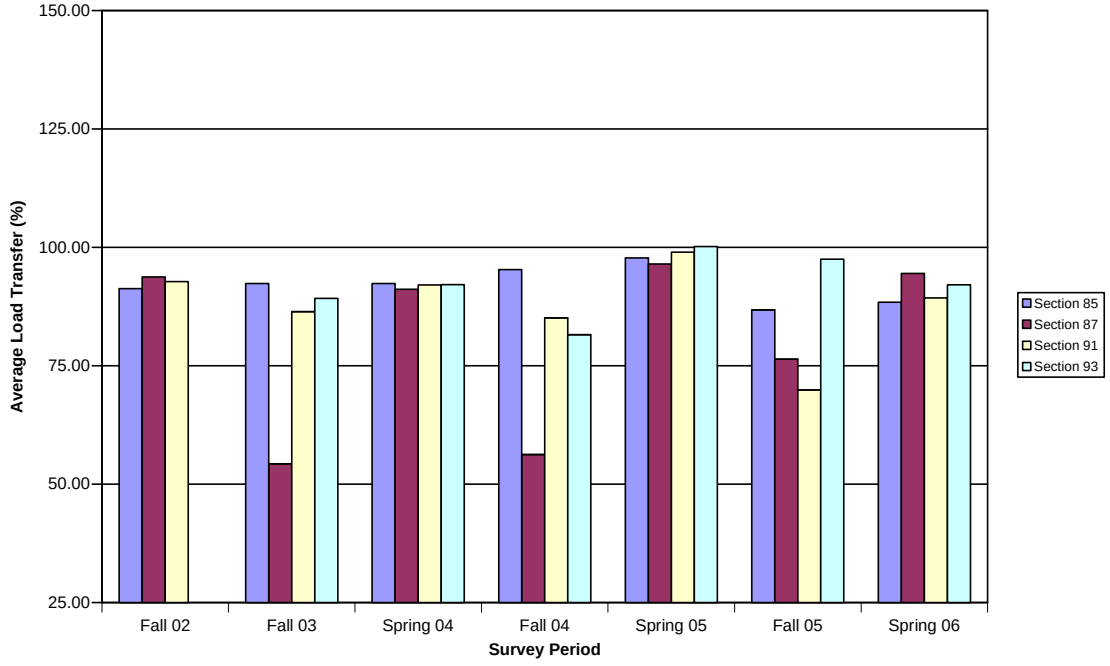

Figure A.22. Load transfer, 3.5” depth, HMA S. R., fiber C, 9’ panel

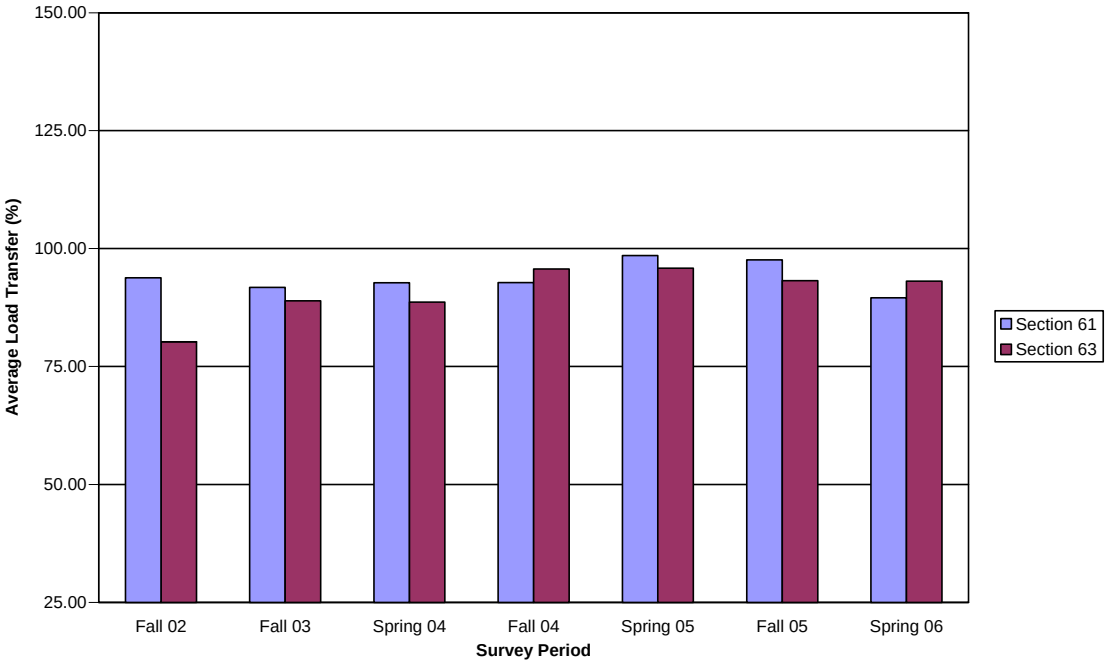

Figure A.23. Load transfer, 4.5” depth, scarify, no fibers, 4.5’ panel

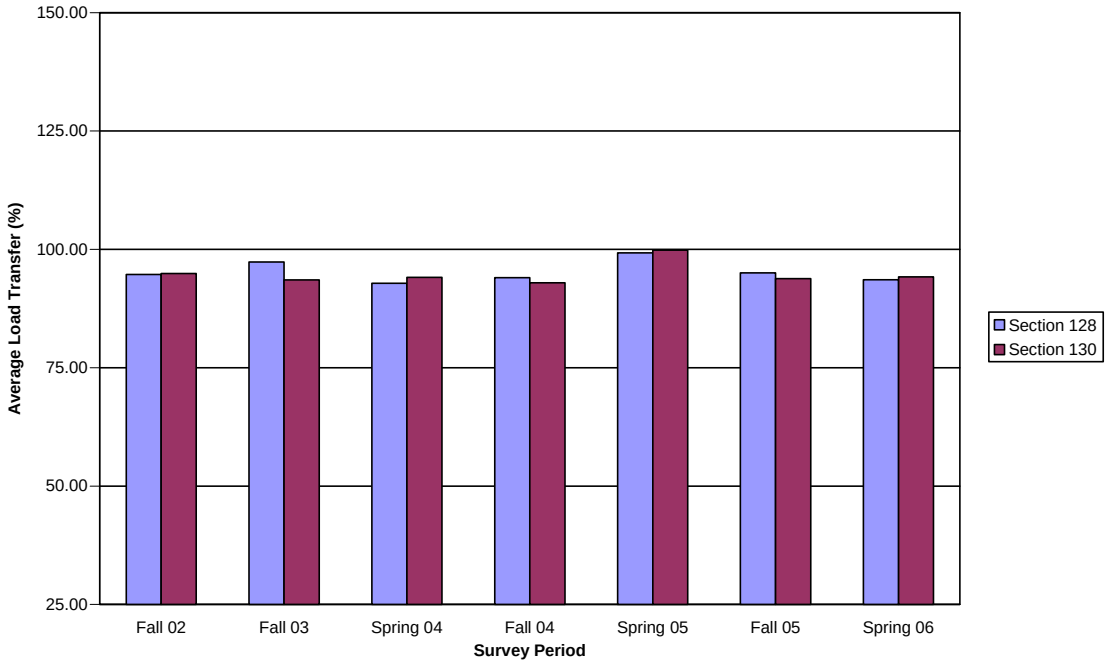

Figure A.24. Load transfer, 4.5” depth, HMA S. R., no fibers, 4.5’ panel

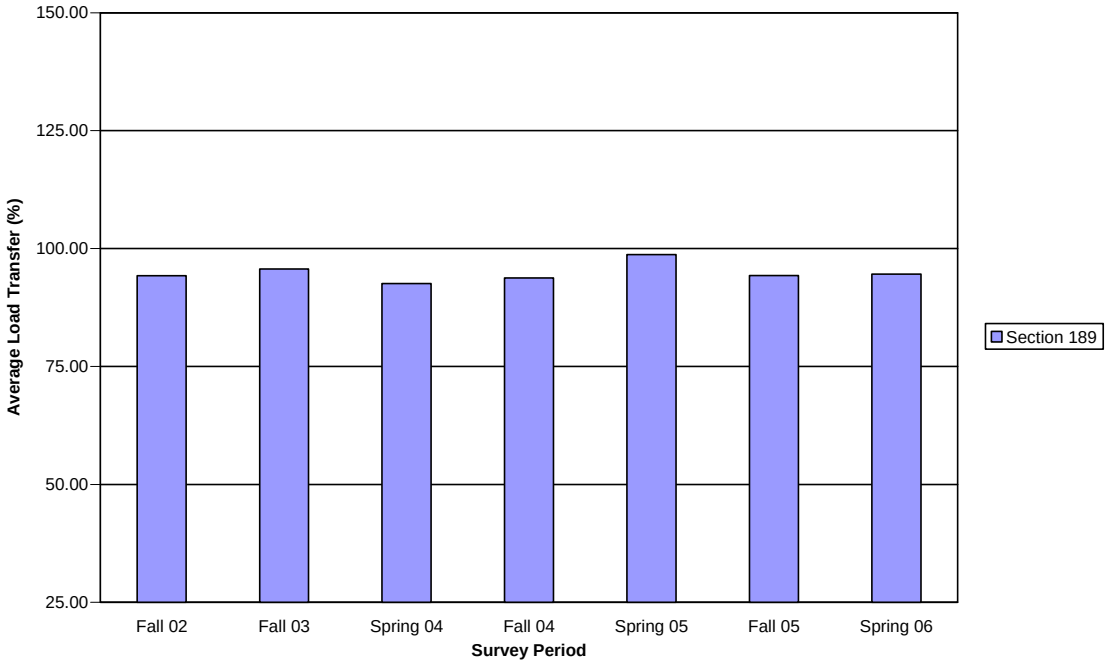

Figure A.25. Load transfer, 4.5” depth, patch, no fibers, 4.5’ panel

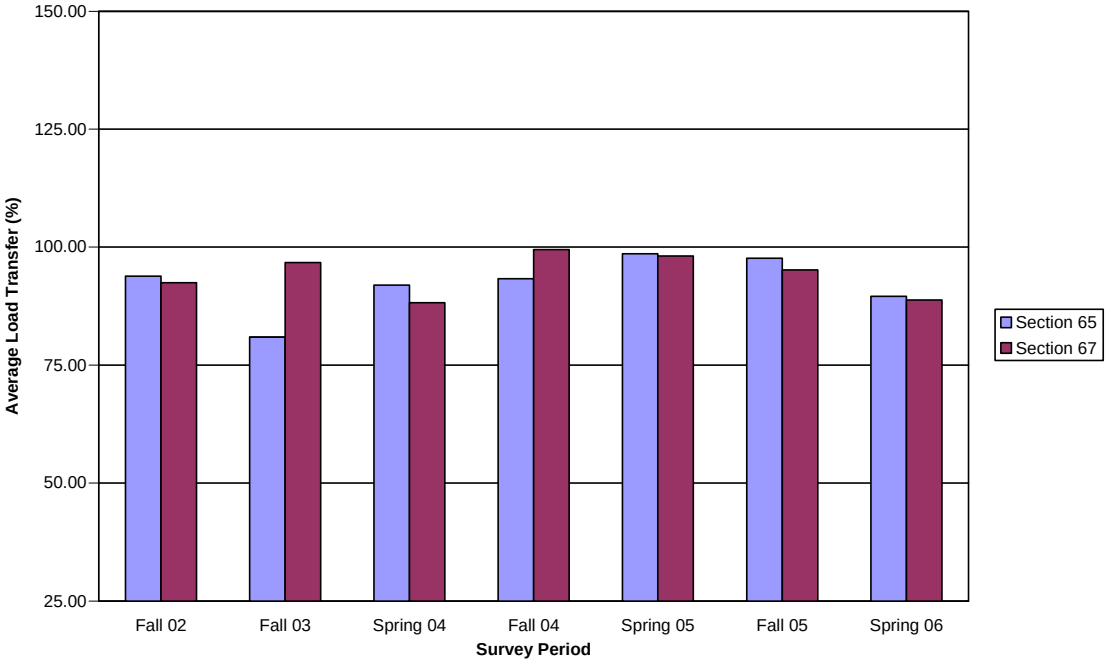

Figure A.26. Load transfer, 4.5” depth, scarify, no fibers, 6’ panel

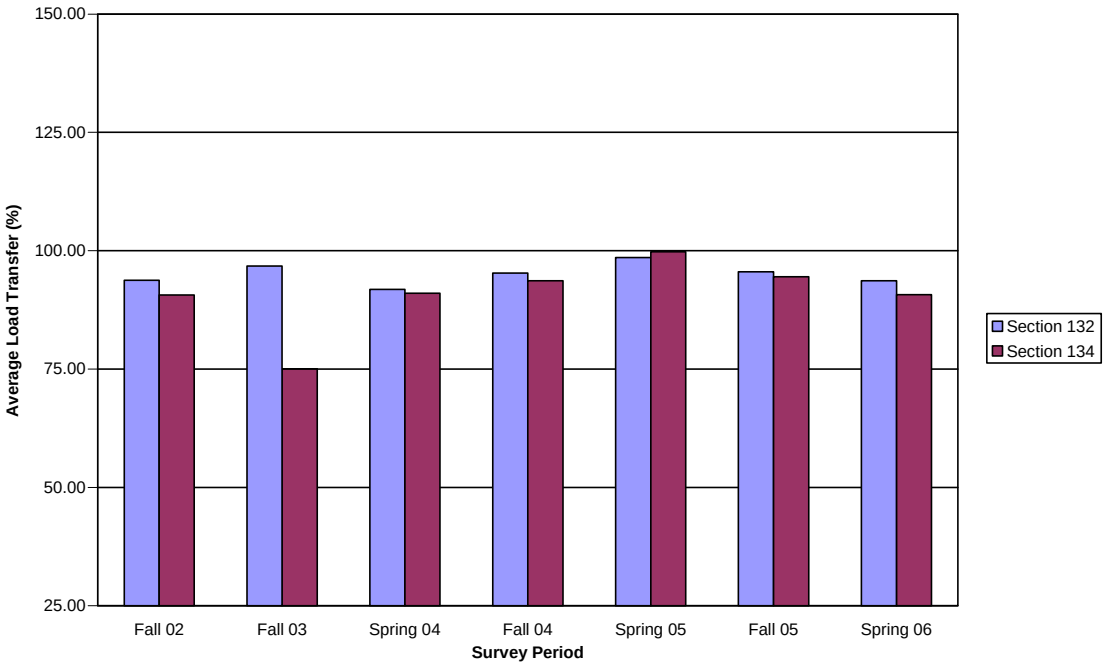

Figure A.27. Load transfer, 4.5” depth, HMA S. R., no fibers, 6’ panel

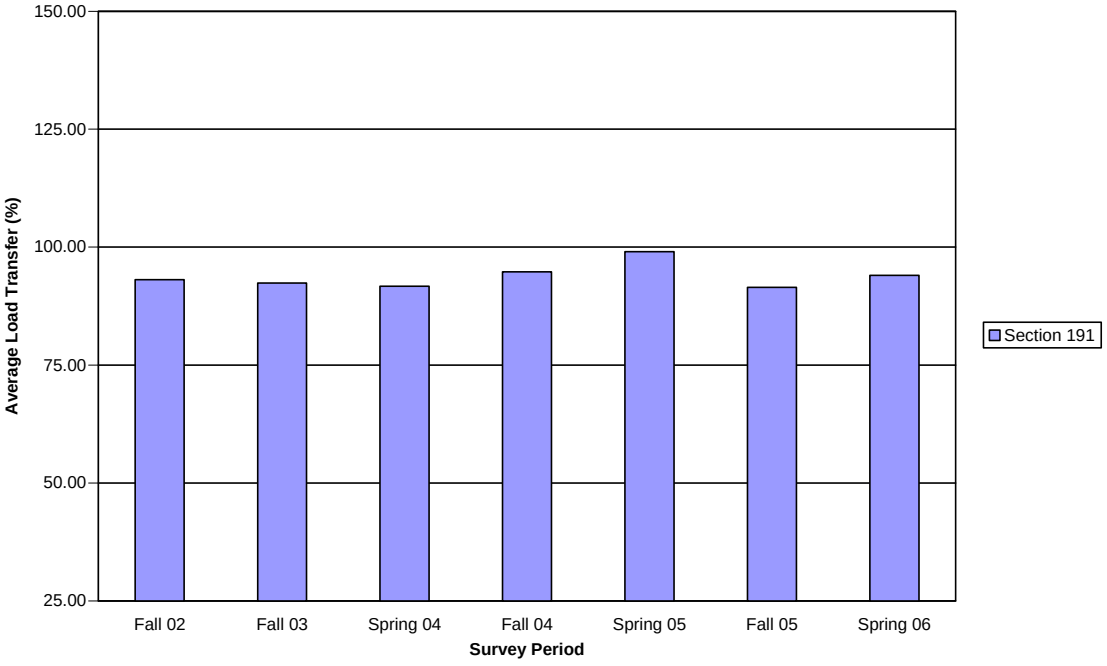

Figure A.28. Load transfer, 4.5” depth, patch, no fibers, 6’ panel

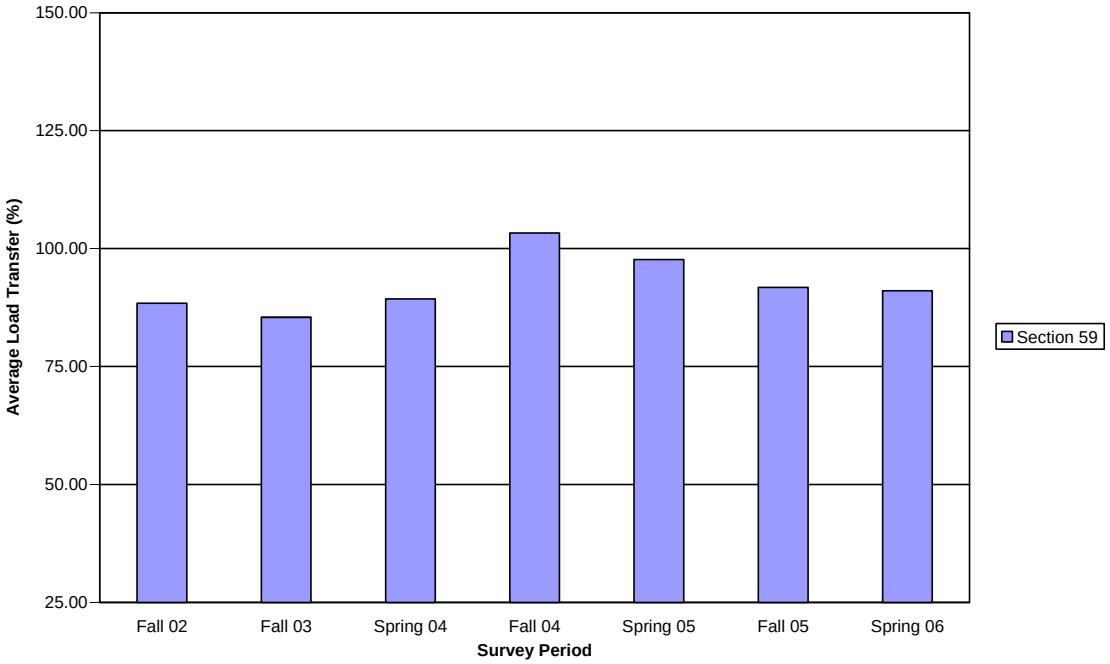

Figure A.29. Load transfer, 4.5” depth, remove, no fibers, 6’ panel

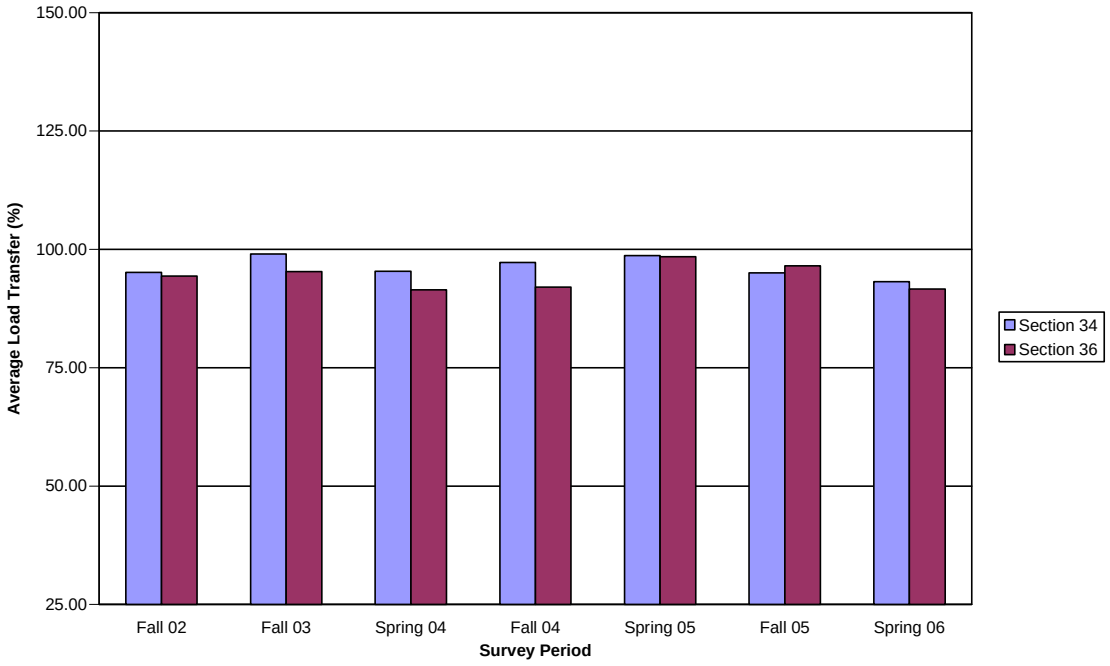

Figure A.30. Load transfer, 4.5” depth, scarify, fiber A, 4.5’ panel

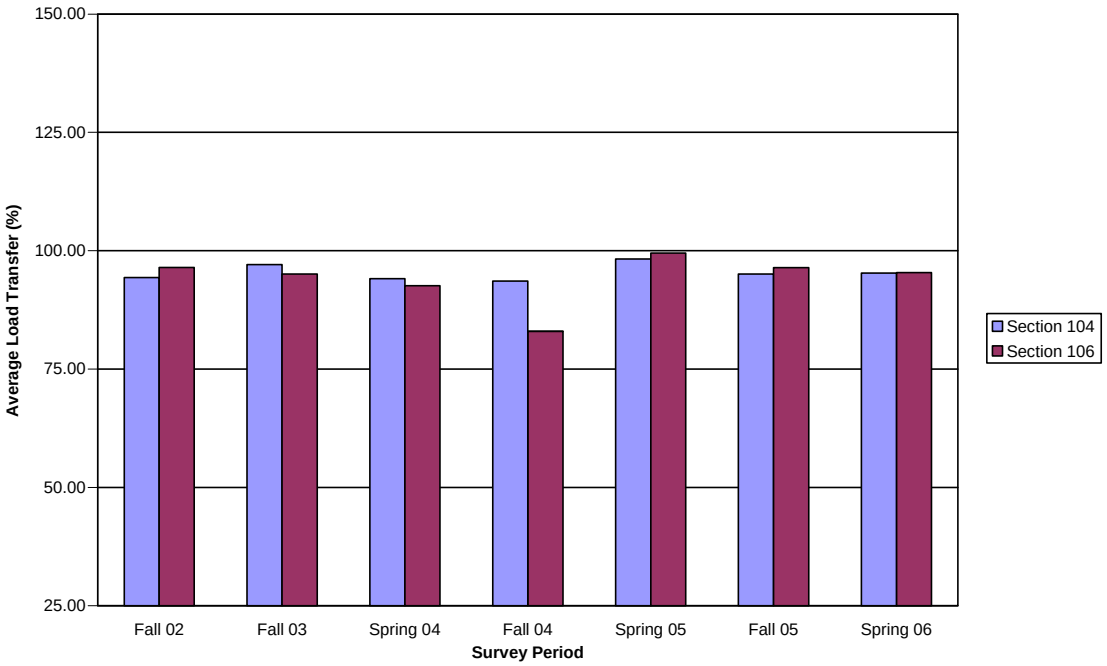

Figure A.31. Load transfer, 4.5” depth, HMA S. R., fiber A, 4.5’ panel

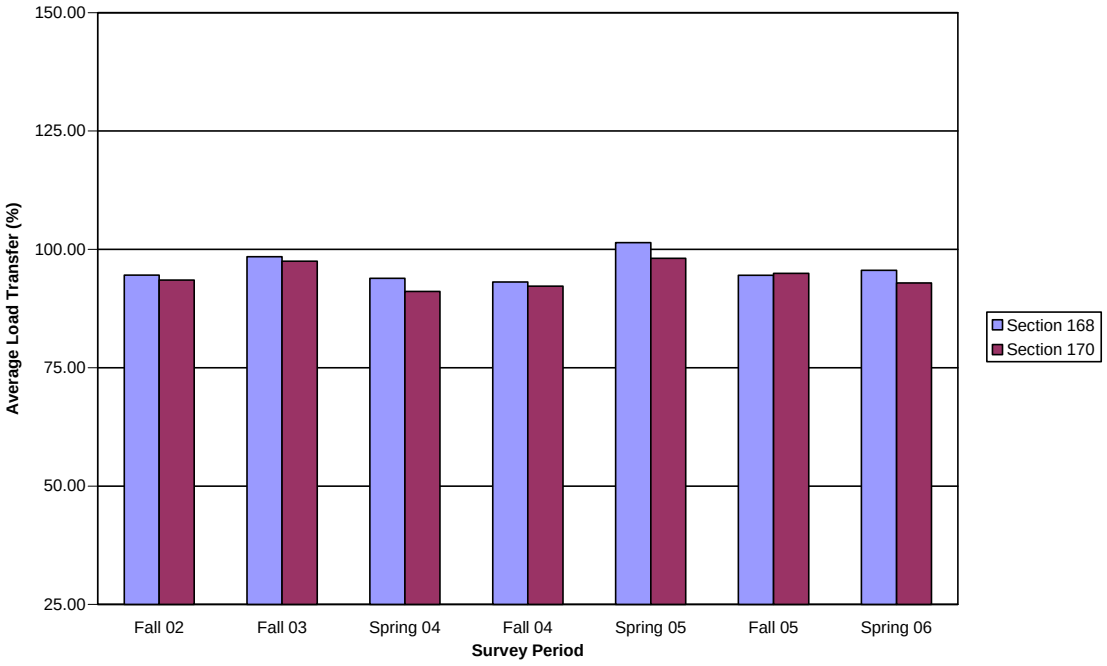

Figure A.32. Load transfer, 4.5” depth, patch, fiber A, 4.5’ panel

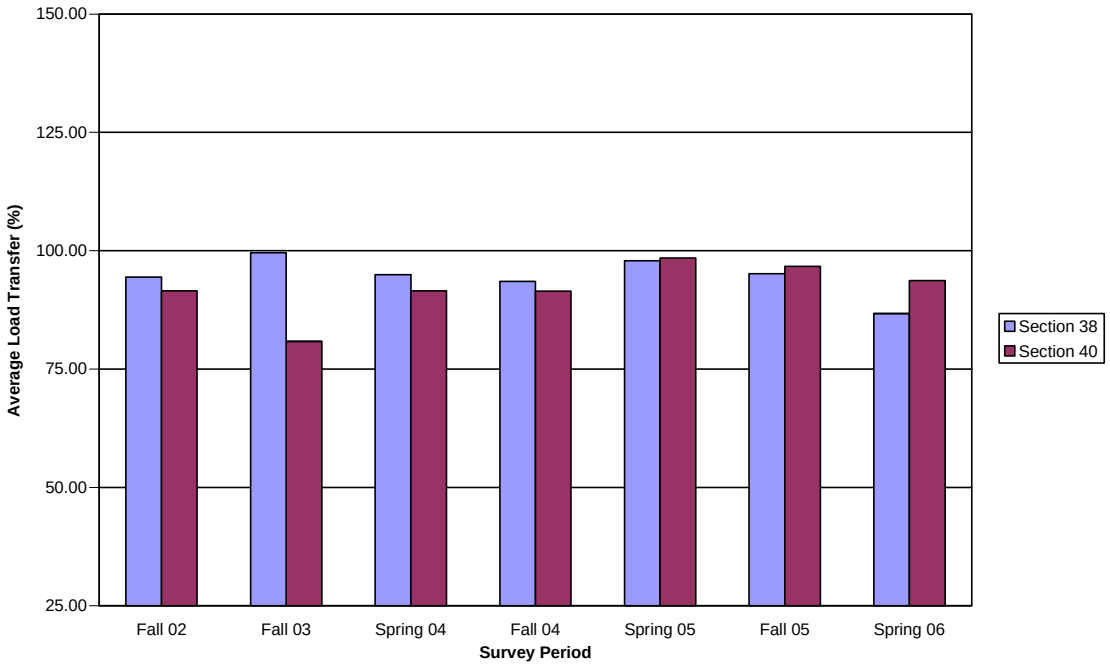

Figure A.33. Load transfer, 4.5” depth, scarify, fiber A, 6’ panel

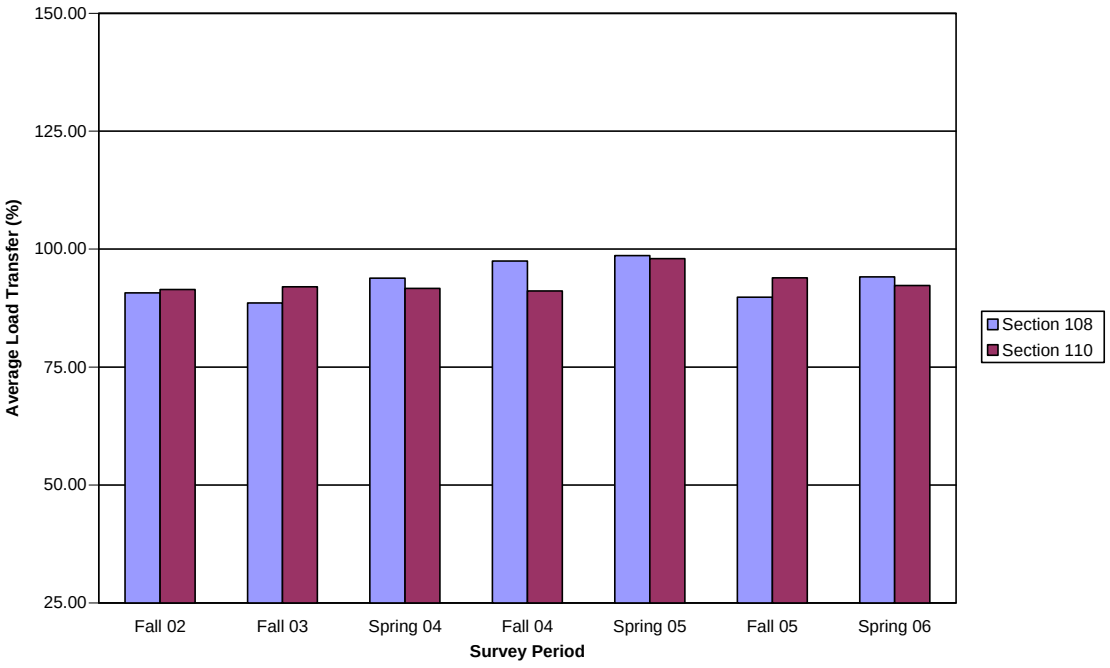

Figure A.34. Load transfer, 4.5” depth, HMA S. R., fiber A, 6’ panel

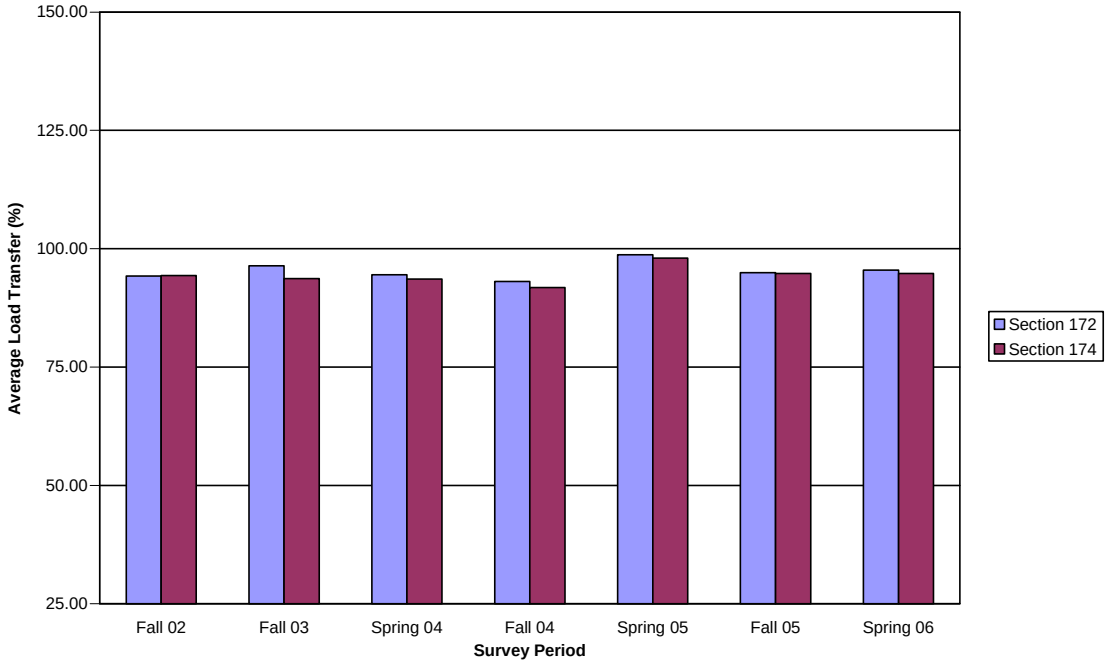

Figure A.35. Load transfer, 4.5” depth, patch, fiber A, 6’ panel

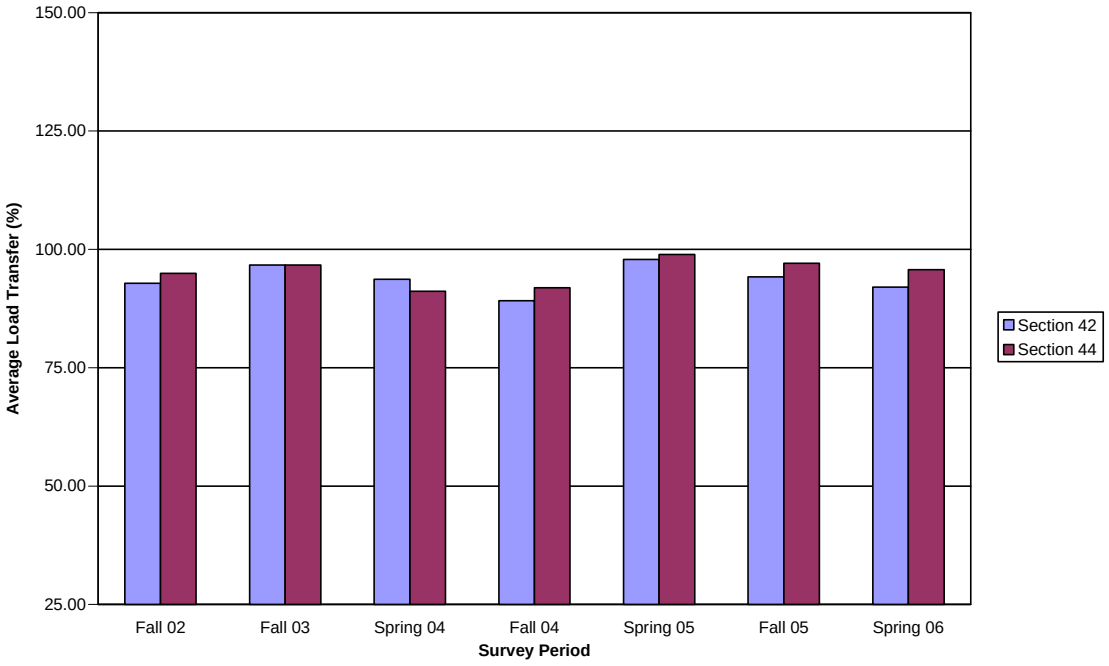

Figure A.36. Load transfer, 4.5” depth, scarify, fiber B, 4.5’ panel

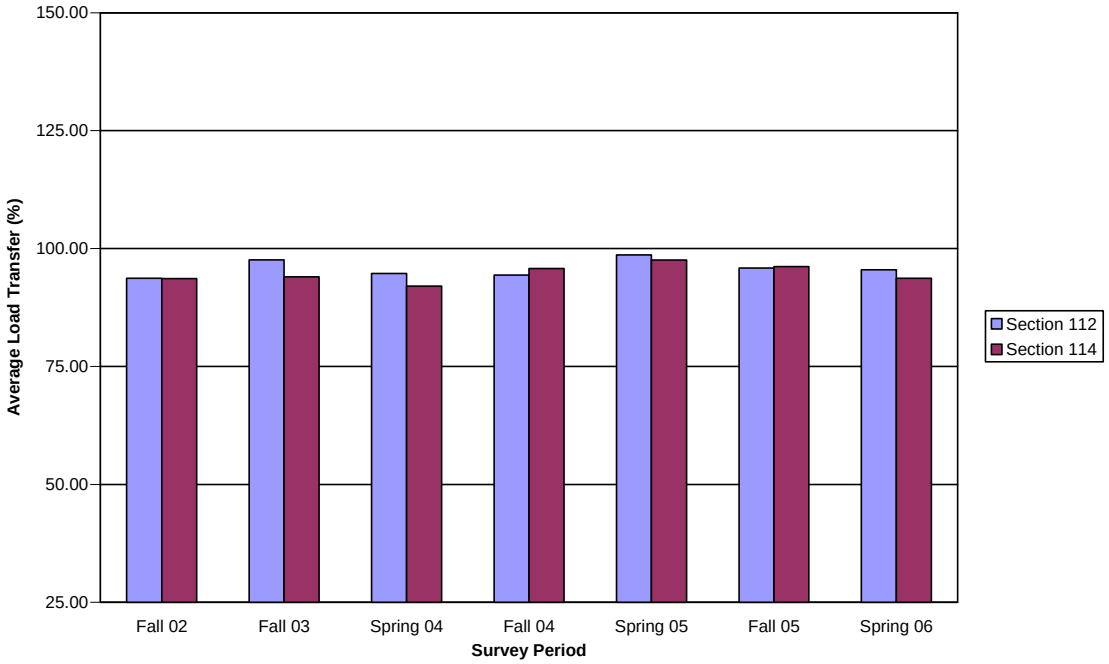

Figure A.37. Load transfer, 4.5” depth, HMA S. R., fiber B, 4.5’ panel

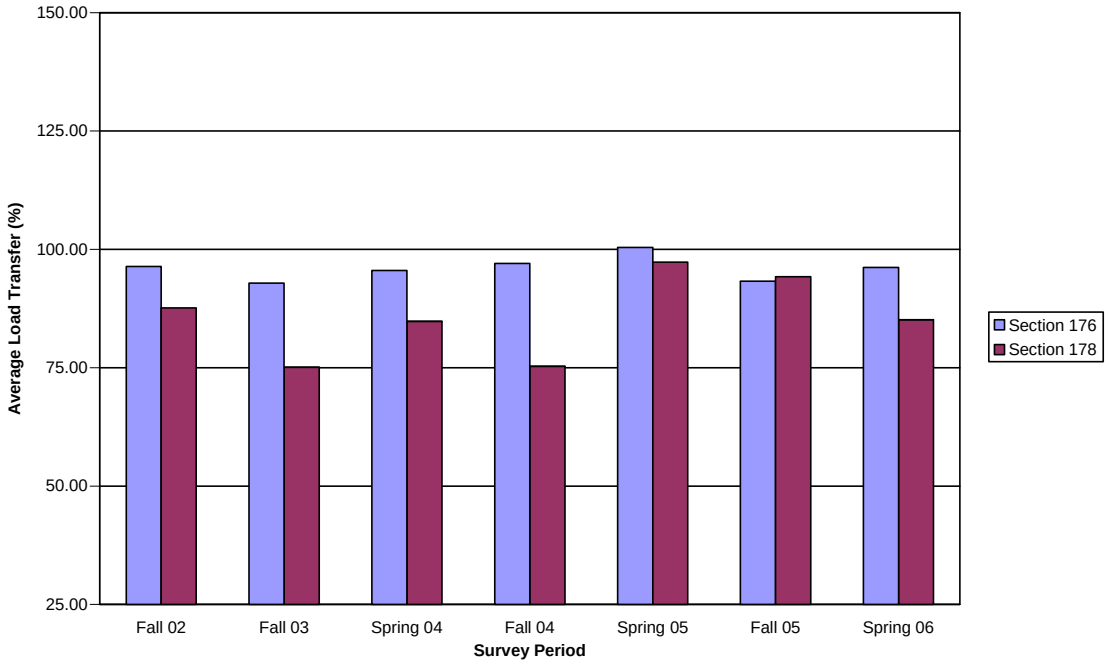

Figure A.38. Load transfer, 4.5” depth, patch, fiber B, 4.5’ panel

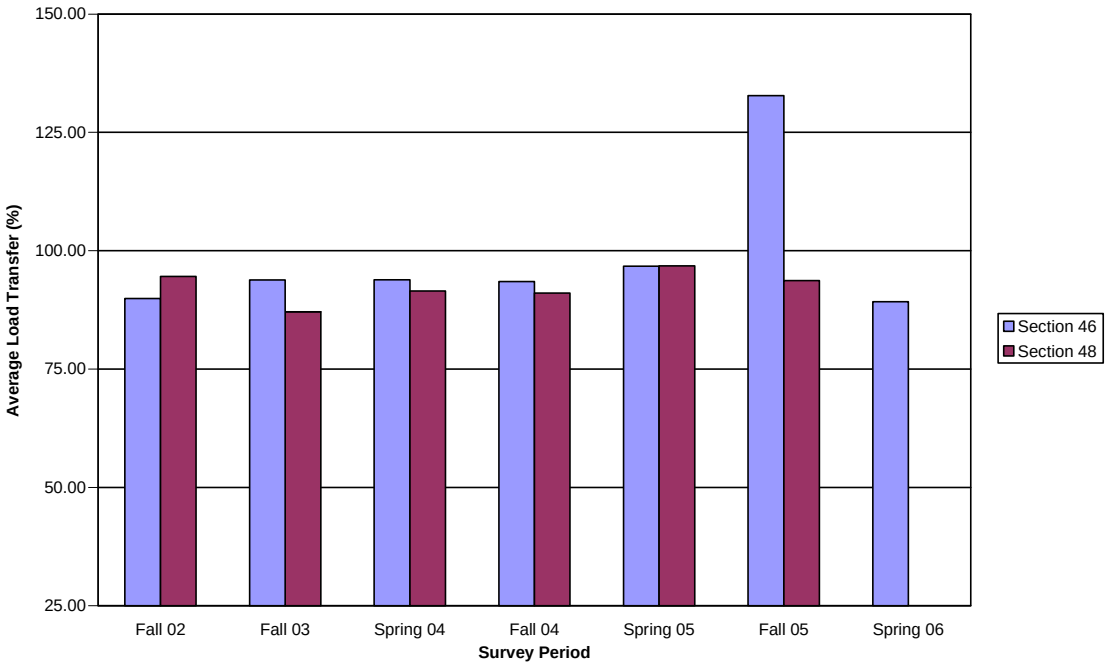

Figure A.39. Load transfer, 4.5” depth, scarify, fiber B, 6’ panel

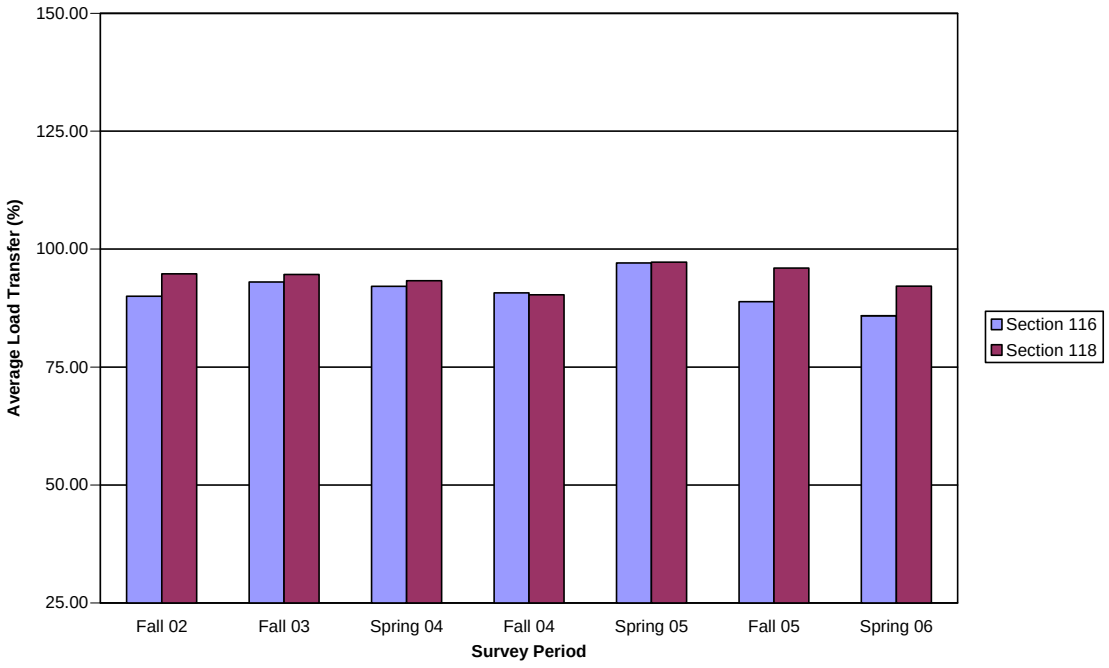

Figure A.40. Load transfer, 4.5” depth, HMA S. R., fiber B, 6’ panel

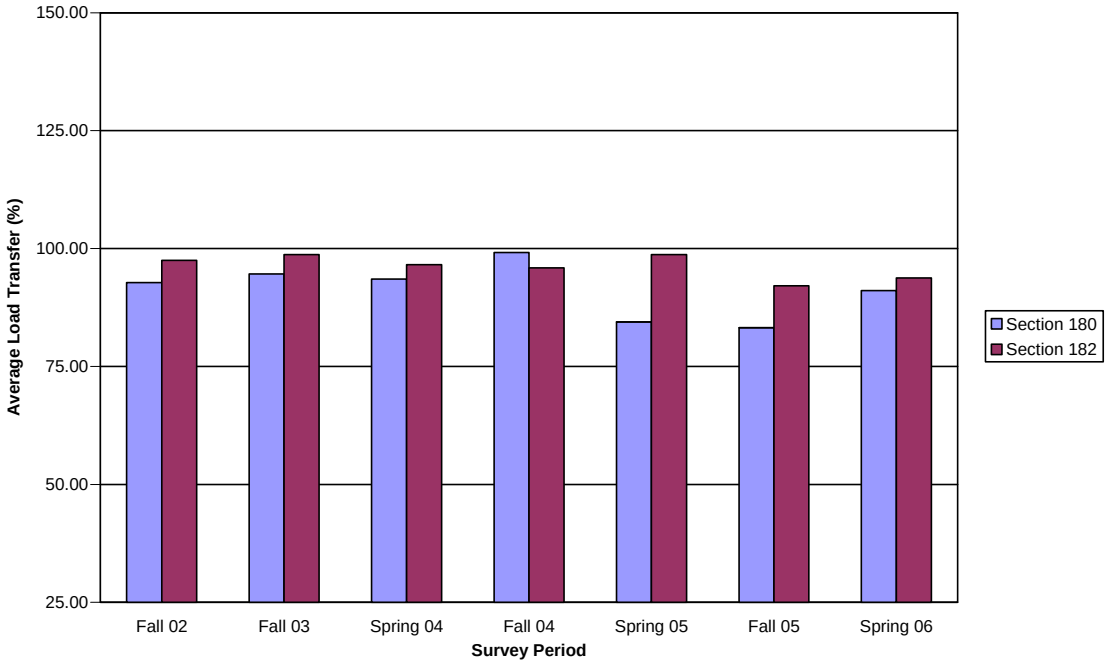

Figure A.41. Load transfer, 4.5” depth, patch, fiber B, 6’ panel

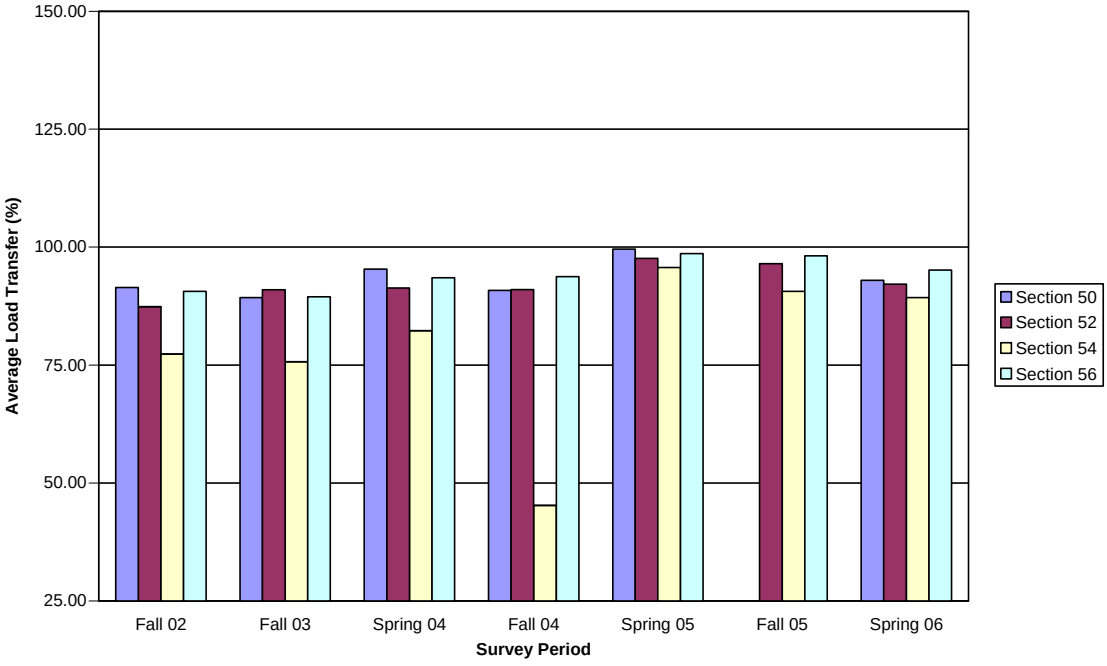

Figure A.42. Load transfer, 4.5” depth, scarify, fiber C, 9’ panel

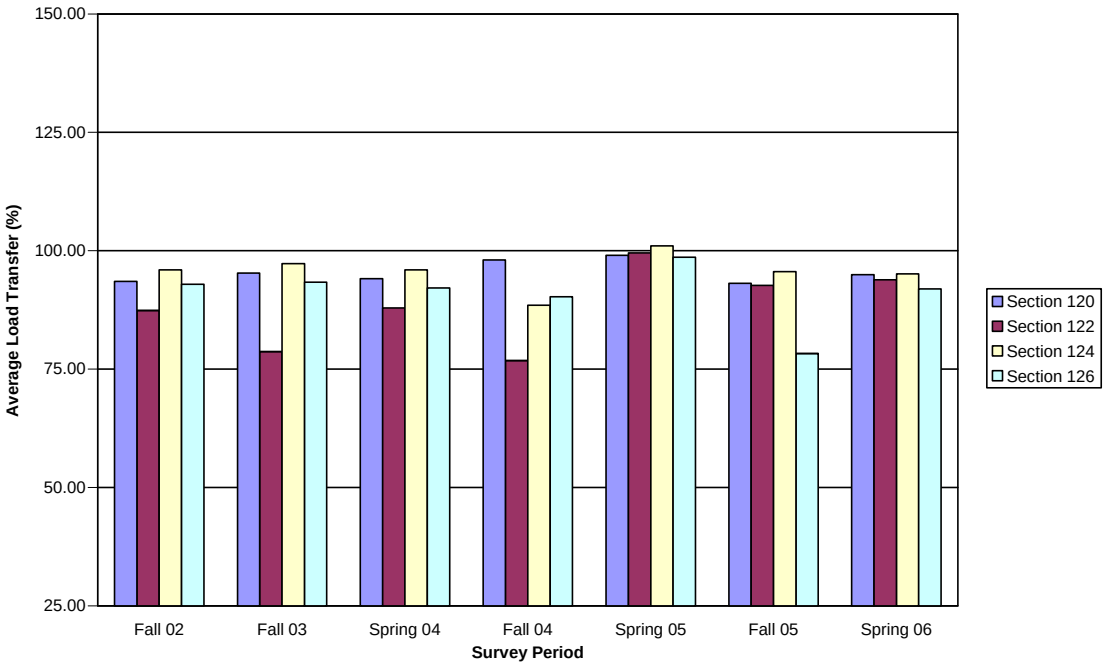

Figure A.43. Load transfer, 4.5” depth, HMA S. R., fiber C, 9’ panel

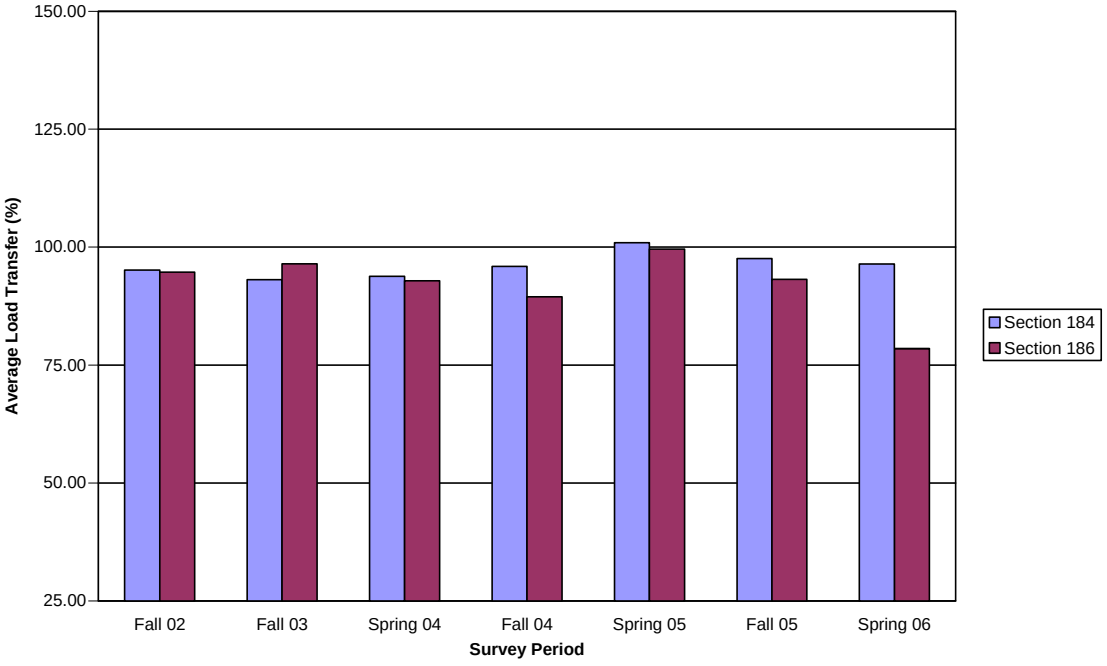

Figure A.44. Load transfer, 4.5” depth, patch, fiber C, 9’ panel

APPENDIX B: FAULTING DATA

Table B.1. Fault Data for Overlay 3.5 in. Thick

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
A															
						NB	Max.	2.09	0.74	1.06	1.59	0.50	3.23	3.93	27.63
							Min.	-1.36	-0.92	-1.85	-1.27	-1.00	0.00	-0.34	1.84
							Avg.	0.04	-0.13	-0.71	0.27	-0.23	0.94	1.38	5.10
							Inches	0.00	-0.01	-0.03	0.01	-0.01	0.04	0.05	0.20
		Scarify	33	113+50	119+50	SB	Max.	0.63	0.00	1.32	0.32	0.00	2.69	2.05	-0.61
							Min.	-1.36	-0.92	-0.40	-2.86	-0.80	-2.69	0.00	-5.83
							Avg.	-0.41	-0.46	0.32	-1.53	-0.41	-1.27	0.71	-3.29
							Inches	-0.02	-0.02	0.01	-0.06	-0.02	-0.05	0.03	-0.13
						NB/SB Combined (in.)		**-0.01**	**-0.01**	**-0.01**	**-0.02**	**-0.01**	**-0.01**	**0.04**	**0.04**
						NB	Max.	1.58	0.86	0.33	0.50	1.04	2.33	4.61	7.42
							Min.	-3.83	-2.78	-1.44	-1.67	-1.04	-2.19	0.00	0.27
							Avg.	-0.25	-0.43	-0.98	-0.77	-0.51	0.29	1.86	3.08
							Inches	-0.01	-0.02	-0.04	-0.03	-0.02	0.01	0.07	0.12
			69	209+00	213+00	SB	Max.	1.98	0.00	2.11	-0.17	0.60	1.75	1.20	0.27
							Min.	-2.25	-0.96	-0.33	-2.83	-0.69	-1.31	-0.51	-5.57
							Avg.	-0.17	-0.10	0.63	-1.43	-0.25	0.09	0.36	-1.94
							Inches	-0.01	0.00	0.02	-0.06	-0.01	0.00	0.01	-0.08
		HMA S.R.				**NB/SB Combined (in.)**		**-0.01**	**-0.01**	**-0.01**	**-0.04**	**-0.01**	**0.01**	**0.04**	**0.02**
						NB	Max.	1.58	0.28	0.89	1.00	0.60	1.75	3.59	4.77
							Min.	-2.11	-1.51	-1.44	-1.33	-0.86	0.00	-0.17	1.86
							Avg.	-0.04	-0.57	-0.43	-0.50	0.03	0.89	1.35	2.78
							Inches	0.00	-0.02	-0.02	-0.02	0.00	0.04	0.05	0.11
	4.5		71	214+00	218+00	SB	Max.	2.38	0.00	0.44	-1.17	-0.09	1.02	3.41	-2.12
							Min.	-1.06	0.00	-0.44	-3.00	-0.69	-0.88	0.00	-7.16
							Avg.	0.28	0.00	0.10	-2.32	-0.52	0.34	1.14	-4.30
							Inches	0.01	0.00	0.00	-0.09	-0.02	0.01	0.05	-0.17
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.01**	**-0.06**	**-0.01**	**0.02**	**0.05**	**-0.03**
						NB	Max.	2.92	0.46	0.35	1.45	0.35	2.14	2.75	0.44
							Min.	-2.14	-1.84	-0.86	-1.19	-0.57	0.00	-0.69	-3.28
							Avg.	-0.06	-0.96	-0.14	-0.25	-0.01	1.26	0.59	-1.09
							Inches	0.00	-0.04	-0.01	-0.01	0.00	0.05	0.02	-0.04
			136	375+00	379+00	SB	Max.	2.33	0.00	0.95	-0.92	0.57	0.86	2.33	1.09
							Min.	-1.94	-1.15	-0.09	-2.25	-0.57	-0.43	0.27	-0.44
							Avg.	0.74	-0.23	0.39	-1.81	-0.30	0.11	0.86	0.57
							Inches	0.03	-0.01	0.02	-0.07	-0.01	0.00	0.03	0.02
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.00**	**-0.04**	**-0.01**	**0.03**	**0.03**	**-0.01**
		Patch				NB	Max.	3.50	1.49	0.48	0.66	0.51	2.14	1.88	2.84
							Min.	-1.36	-1.61	-0.97	-1.19	-0.94	-2.57	-1.75	-2.19
							Avg.	0.72	-0.14	-0.37	-0.48	-0.17	0.33	0.33	0.39
							Inches	0.03	-0.01	-0.01	-0.02	-0.01	0.01	0.01	0.02
			138	380+00	384+00	SB	Max.	3.11	0.00	0.97	-0.79	0.43	2.57	3.75	1.97
							Min.	-2.14	-1.15	-0.08	-2.51	-0.65	-0.57	-0.63	0.00
							Avg.	0.56	-0.23	0.49	-1.62	-0.17	0.46	0.81	0.85
							Inches	0.02	-0.01	0.02	-0.06	-0.01	0.02	0.03	0.03
						NB/SB Combined (in.)		**0.03**	**-0.01**	**0.00**	**-0.04**	**-0.01**	**0.02**	**0.02**	**0.02**
	6.0	Scarify	31	107+00	113+00	NB	Max.	1.57	0.65	0.00	1.52	0.39	2.00	4.61	4.70
							Min.	-0.94	-1.03	-2.38	-1.82	-1.26	-2.17	0.55	-0.21
							Avg.	0.24	-0.42	-1.37	0.20	-0.28	0.28	2.14	2.20
							Inches	0.01	-0.02	-0.05	0.01	-0.01	0.01	0.08	0.09
						SB	Max.	0.31	0.00	1.06	1.36	0.39	1.67	1.84	0.00

Fiber Type	Panel Size	Surface Prep.	Section	Station Begin	Station End	Lane		Faulting Values, mm Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Min.	-1.36	-0.93	-0.40	-2.88	-0.78	-1.50	-0.92	-4.48
							Avg.	-0.45	-0.37	0.22	-1.14	-0.20	-0.07	0.53	-2.60
							Inches	-0.02	-0.01	0.01	-0.04	-0.01	0.00	0.02	-0.10
						NB/SB Combined (in.)		**0.00**	**-0.02**	**-0.02**	**-0.02**	**-0.01**	**0.00**	**0.05**	**-0.01**
		HMA S.R.	73	219+00	223+00	NB	Max.	1.98	0.76	0.55	0.93	1.02	2.44	2.28	8.95
							Min.	-1.32	-0.76	-1.97	-1.24	-0.68	0.00	-0.91	-1.60
							Avg.	0.71	-0.01	-0.83	-0.14	0.09	0.88	0.46	3.58
							Inches	0.03	0.00	-0.03	-0.01	0.00	0.03	0.02	0.14
						SB	Max.	1.98	0.00	1.86	0.93	0.94	2.60	2.59	1.92
							Min.	-2.11	-1.89	-1.20	-3.42	-1.79	-0.65	-2.28	-6.39
							Avg.	-0.25	-0.38	0.32	-1.45	-0.44	0.46	-0.09	-2.24
							Inches	-0.01	-0.01	0.01	-0.06	-0.02	0.02	0.00	-0.09
						NB/SB Combined (in.)		**0.01**	**-0.01**	**-0.01**	**-0.03**	**-0.01**	**0.03**	**0.01**	**0.03**
			75	224+00	228+00	NB	Max.	1.72	0.86	0.00	0.00	-0.34	1.63	2.28	4.79
							Min.	-1.72	-0.77	-2.50	-5.04	-0.85	-1.30	-1.07	-0.32
							Avg.	0.12	0.04	-1.14	-3.36	-0.61	0.46	0.87	2.27
							Inches	0.00	0.00	-0.04	-0.13	-0.02	0.02	0.03	0.09
						SB	Max.	2.25	0.19	1.75	0.28	0.34	1.14	0.76	-1.92
							Min.	-1.19	-0.96	-1.63	-2.80	-0.85	-0.49	-0.76	-6.07
							Avg.	0.44	-0.44	0.19	-1.48	-0.15	0.26	0.05	-4.28
							Inches	0.02	-0.02	0.01	-0.06	-0.01	0.01	0.00	-0.17
						NB/SB Combined (in.)		**0.01**	**-0.01**	**-0.02**	**-0.10**	**-0.01**	**0.01**	**0.02**	**-0.04**
		Patch	140	385+00	389+00	NB	Max.	4.29	1.45	0.09	0.92	0.36	2.14	3.00	3.28
							Min.	-2.71	-1.81	-1.11	-1.72	-0.94	-3.29	-1.25	-3.28
							Avg.	0.43	-0.11	-0.57	-0.23	-0.21	0.04	0.53	0.09
							Inches	0.02	0.00	-0.02	-0.01	-0.01	0.00	0.02	0.00
						SB	Max.	2.48	0.84	0.60	-0.57	0.22	1.71	0.63	1.53
							Min.	-3.39	-2.41	0.00	-2.06	-0.65	-0.57	-0.63	-0.88
							Avg.	0.34	-0.40	0.35	-1.54	-0.31	0.23	0.14	0.26
							Inches	0.01	-0.02	0.01	-0.06	-0.01	0.01	0.01	0.01
						NB/SB Combined (in.)		**0.02**	**-0.01**	**0.00**	**-0.03**	**-0.01**	**0.01**	**0.01**	**0.01**
			142	390+00	394+00	NB	Max.	2.50	1.47	0.34	1.14	0.58	2.86	2.88	1.09
							Min.	-1.00	-3.56	-1.43	-1.27	-0.94	0.00	-1.75	-3.72
							Avg.	0.69	-0.84	-0.58	-0.10	-0.11	1.24	0.56	-0.66
							Inches	0.03	-0.03	-0.02	0.00	0.00	0.05	0.02	-0.03
						SB	Max.	1.50	0.00	1.52	0.00	0.58	2.43	1.25	1.09
							Min.	-1.38	-1.23	-1.01	-2.03	-0.65	-0.43	-0.38	-0.66
							Avg.	0.06	-0.49	0.36	-1.58	-0.19	0.59	0.44	0.59
							Inches	0.00	-0.02	0.01	-0.06	-0.01	0.02	0.02	0.02
						NB/SB Combined (in.)		**0.01**	**-0.03**	**0.00**	**-0.03**	**-0.01**	**0.04**	**0.02**	**0.00**
B	4.5	Scarify	9	52+00	56+00	NB	Max.	1.15	0.08	0.00	1.35	0.38	2.38	1.93	2.13
							Min.	-0.84	-0.82	-3.30	0.17	-1.23	-1.82	-1.40	0.53
							Avg.	0.17	-0.43	-1.66	0.74	-0.59	0.77	0.30	1.47
							Inches	0.01	-0.02	-0.07	0.03	-0.02	0.03	0.01	0.06
						SB	Max.	1.04	0.00	1.32	-0.51	0.76	1.40	1.93	0.71
							Min.	-1.04	-1.65	-1.32	-3.04	-1.14	-1.54	-2.28	-33.67
							Avg.	-0.01	-0.33	0.20	-1.79	-0.54	-0.60	0.39	-5.39
							Inches	0.00	-0.01	0.01	-0.07	-0.02	-0.02	0.02	-0.21
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.03**	**-0.02**	**-0.02**	**0.00**	**0.01**	**-0.08**
		HMA S.R.	77	229+00	233+00	NB	Max.	2.64	0.19	0.84	0.39	0.68	2.44	2.13	5.75
							Min.	-0.66	-1.04	-1.36	-1.17	-0.94	0.00	-1.83	1.28
							Avg.	1.08	-0.54	-0.55	-0.56	-0.26	0.86	0.46	3.32
							Inches	0.04	-0.02	-0.02	-0.02	-0.01	0.03	0.02	0.13
						SB	Max.	1.98	0.19	1.67	-0.13	0.34	2.77	1.52	2.24

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Min.	-0.66	-0.95	0.00	-2.20	-0.68	-0.49	-0.76	-6.07
							Avg.	0.15	-0.45	0.44	-1.19	-0.37	0.68	0.32	-2.05
							Inches	0.01	-0.02	0.02	-0.05	-0.01	0.03	0.01	-0.08
						NB/SB Combined (in.)		**0.02**	**-0.02**	**0.00**	**-0.03**	**-0.01**	**0.03**	**0.02**	**0.03**
						NB	Max.	1.85	0.22	0.73	0.91	0.51	2.44	1.83	6.07
							Min.	-0.92	-1.22	-1.46	-1.04	-0.94	-0.49	-2.28	-0.96
							Avg.	0.11	-0.31	-0.51	-0.21	-0.15	0.73	0.24	2.05
							Inches	0.00	-0.01	-0.02	-0.01	-0.01	0.03	0.01	0.08
			79	234+00	238+00	SB	Max.	3.57	0.00	0.63	-0.91	0.17	0.98	1.67	-2.24
							Min.	-1.06	-2.22	-0.31	-2.33	-0.77	-0.65	-0.61	-6.71
							Avg.	0.79	-1.00	0.15	-1.76	-0.24	-0.03	0.43	-4.63
							Inches	0.03	-0.04	0.01	-0.07	-0.01	0.00	0.02	-0.18
						NB/SB Combined (in.)		**0.02**	**-0.03**	**-0.01**	**-0.04**	**-0.01**	**0.01**	**0.01**	**-0.05**
		Patch				NB	Max.	3.61	1.50	0.26	1.14	1.08	2.14	2.63	1.75
							Min.	-3.39	-2.13	-1.11	-1.01	-0.51	-1.43	-1.88	-3.28
							Avg.	0.13	-0.80	-0.44	-0.20	0.09	0.74	-0.01	0.00
							Inches	0.01	-0.03	-0.02	-0.01	0.00	0.03	0.00	0.00
			144	395+00	399+00	SB	Max.	5.52	0.00	1.37	0.00	0.65	0.86	1.38	1.53
							Min.	-1.06	-1.25	-0.68	-2.15	-0.94	-0.43	-0.63	-1.09
							Avg.	1.51	-0.38	0.50	-1.24	-0.24	0.19	0.18	0.07
							Inches	0.06	-0.01	0.02	-0.05	-0.01	0.01	0.01	0.00
						NB/SB Combined (in.)		**0.03**	**-0.02**	**0.00**	**-0.03**	**0.00**	**0.02**	**0.00**	**0.00**
						NB	Max.	3.50	1.06	0.60	1.65	1.07	2.69	2.92	4.38
							Min.	-1.03	-3.17	-1.20	-1.14	-0.71	-0.81	-2.80	-2.84
							Avg.	0.89	-1.04	-0.60	0.46	0.14	0.66	-0.09	0.04
							Inches	0.03	-0.04	-0.02	0.02	0.01	0.03	0.00	0.00
			146	400+00	404+00	SB	Max.	2.88	0.00	1.45	0.00	0.86	2.02	0.58	2.63
							Min.	-2.68	0.00	-0.17	-2.28	-0.93	-1.21	-0.93	-3.28
							Avg.	0.04	0.00	0.68	-1.22	0.03	0.70	-0.06	0.09
							Inches	0.00	0.00	0.03	-0.05	0.00	0.03	0.00	0.00
						NB/SB Combined (in.)		**0.02**	**-0.02**	**0.00**	**-0.01**	**0.00**	**0.03**	**0.00**	**0.00**
	6.0					NB	Max.	1.15	0.17	-0.13	2.02	0.66	2.10	3.68	3.54
							Min.	-1.15	-1.02	-1.85	0.51	-1.04	0.28	0.53	0.00
							Avg.	0.04	-0.40	-1.20	1.30	-0.41	1.02	1.80	1.88
							Inches	0.00	-0.02	-0.05	0.05	-0.02	0.04	0.07	0.07
			11	57+00	61+00	SB	Max.	0.31	0.00	1.58	1.35	0.19	0.56	3.85	-1.42
							Min.	-1.57	-0.85	-0.40	-3.04	-0.95	-1.40	-1.05	-3.72
							Avg.	-0.38	-0.17	0.45	-1.21	-0.46	-0.69	0.42	-1.88
							Inches	-0.01	-0.01	0.02	-0.05	-0.02	-0.03	0.02	-0.07
						NB/SB Combined (in.)		**-0.01**	**-0.01**	**-0.01**	**0.00**	**-0.02**	**0.01**	**0.04**	**0.00**
		Scarify				NB	Max.	0.94	1.02	0.14	2.36	0.76	1.54	3.68	4.08
							Min.	-1.04	-1.11	-2.06	-0.17	-0.85	-0.28	-0.53	0.89
							Avg.	0.09	-0.14	-0.85	0.73	0.01	0.56	1.30	1.93
							Inches	0.00	-0.01	-0.03	0.03	0.00	0.02	0.05	0.08
			13	62+00	66+00	SB	Max.	1.15	0.00	0.69	0.00	0.19	1.82	1.40	-0.18
							Min.	-0.84	-0.85	-0.14	-3.04	-0.95	-0.98	-0.70	-3.37
							Avg.	0.20	-0.43	0.08	-1.53	-0.33	0.03	0.46	-1.81
							Inches	0.01	-0.02	0.00	-0.06	-0.01	0.00	0.02	-0.07
						NB/SB Combined (in.)		**0.01**	**-0.01**	**-0.02**	**-0.02**	**-0.01**	**0.01**	**0.03**	**0.00**
		HMA S.R.	81	239+00	243+00	NB	Max.	1.98	0.19	0.73	0.92	0.42	2.80	3.78	5.48
							Min.	-0.40	-1.32	-1.46	-1.32	-0.93	-0.56	-0.70	-1.19
							Avg.	0.53	-0.59	-0.28	-0.59	-0.26	0.91	1.06	1.69
							Inches	0.02	-0.02	-0.01	-0.02	-0.01	0.04	0.04	0.07
						SB	Max.	1.98	0.00	1.57	-0.66	0.51	1.54	1.40	1.19

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Min.	-2.64	-0.95	0.21	-2.38	-1.43	-0.42	-0.42	-4.76
							Avg.	-0.41	-0.19	0.65	-1.57	-0.43	0.14	0.53	-3.02
							Inches	-0.02	-0.01	0.03	-0.06	-0.02	0.01	0.02	-0.12
						NB/SB Combined (in.)		**0.00**	**-0.02**	**0.01**	**-0.04**	**-0.01**	**0.02**	**0.03**	**-0.03**
			83	244+00	248+00	NB	Max.	0.92	0.19	-0.20	1.06	0.42	2.10	2.10	4.29
							Min.	-1.32	-1.36	-1.12	-1.32	-1.35	0.00	-0.56	-2.38
							Avg.	-0.15	-0.40	-0.72	-0.40	-0.39	0.87	0.94	1.02
							Inches	-0.01	-0.02	-0.03	-0.02	-0.02	0.03	0.04	0.04
						SB	Max.	1.45	0.00	1.22	-0.26	0.76	0.70	1.12	-2.14
							Min.	-0.26	-0.97	-0.20	-2.25	-0.67	-0.56	-0.42	-4.76
							Avg.	0.48	-0.39	0.39	-1.31	-0.13	-0.13	0.34	-3.71
							Inches	0.02	-0.02	0.02	-0.05	-0.01	0.00	0.01	-0.15
						NB/SB Combined (in.)		**0.01**	**-0.02**	**-0.01**	**-0.03**	**-0.01**	**0.01**	**0.03**	**-0.05**
		Patch	148	405+00	409+00	NB	Max.	2.84	0.53	0.34	0.34	-0.40	1.88	2.80	1.53
							Min.	-1.75	-1.72	-1.11	-1.27	-0.71	-0.40	-0.35	-2.84
							Avg.	0.98	-0.66	-0.50	-0.16	-0.20	0.78	0.98	-0.13
							Inches	0.04	-0.03	-0.02	-0.01	-0.01	0.03	0.04	-0.01
						SB	Max.	3.50	0.00	0.94	0.00	0.64	1.62	0.12	2.63
							Min.	-3.28	-1.32	-0.17	-2.03	-0.57	-0.54	-2.45	-1.75
							Avg.	0.31	-0.13	0.21	-1.25	0.08	0.30	-0.62	0.39
							Inches	0.01	-0.01	0.01	-0.05	0.00	0.01	-0.02	0.02
						NB/SB Combined (in.)		**0.03**	**-0.02**	**-0.01**	**-0.03**	**0.00**	**0.02**	**0.01**	**0.01**
			150	410+00	414+00	NB	Max.	3.72	1.21	0.51	1.01	0.36	3.10	2.80	3.00
							Min.	-1.75	-2.29	-1.02	-2.28	-1.29	-1.75	-1.28	-2.80
							Avg.	0.74	-0.78	-0.57	-0.34	-0.27	0.78	0.89	0.60
							Inches	0.03	-0.03	-0.02	-0.01	-0.01	0.03	0.03	0.02
						SB	Max.	2.41	1.35	1.88	-0.51	0.71	1.88	0.82	1.60
							Min.	-3.94	-1.35	0.00	-2.53	-0.57	-0.54	-0.47	-1.80
							Avg.	-0.39	-0.13	0.84	-1.30	0.09	0.61	0.15	-0.06
							Inches	-0.02	-0.01	0.03	-0.05	0.00	0.02	0.01	0.00
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.01**	**-0.03**	**0.00**	**0.03**	**0.02**	**0.01**
C	6.0	Scarify	15	67+00	71+00	NB	Max.	1.15	0.85	-0.41	2.19	0.76	2.10	4.20	3.01
							Min.	-1.36	-1.54	-1.92	0.00	-0.95	-0.28	-0.35	0.53
							Avg.	-0.09	-0.11	-1.40	0.84	-0.10	0.91	2.07	1.67
							Inches	0.00	0.00	-0.06	0.03	0.00	0.04	0.08	0.07
						SB	Max.	0.94	0.00	1.37	-1.35	0.19	-0.14	1.23	-1.06
							Min.	-0.84	-0.85	-0.41	-3.04	-0.95	-1.40	-1.58	-4.08
							Avg.	0.09	-0.26	0.29	-2.34	-0.43	-0.85	0.26	-2.46
							Inches	0.00	-0.01	0.01	-0.09	-0.02	-0.03	0.01	-0.10
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.02**	**-0.03**	**-0.01**	**0.00**	**0.05**	**-0.02**
			17	72+00	76+00	NB	Max.	0.94	0.77	0.82	2.53	0.72	3.50	5.16	3.35
							Min.	-0.73	-1.11	-2.61	0.00	-1.13	-0.18	-0.92	0.00
							Avg.	0.42	-0.25	-0.80	0.98	-0.11	1.17	1.44	1.64
							Inches	0.02	-0.01	-0.03	0.04	0.00	0.05	0.06	0.06
						SB	Max.	1.04	0.00	1.37	0.00	0.93	1.05	2.76	-1.00
							Min.	-1.04	-0.85	-0.55	-2.36	-1.03	-1.58	-0.92	-3.52
							Avg.	0.00	-0.51	0.56	-1.11	-0.28	-0.67	0.68	-1.89
							Inches	0.00	-0.02	0.02	-0.04	-0.01	-0.03	0.03	-0.07
						NB/SB Combined (in.)		**0.01**	**-0.01**	**0.00**	**0.00**	**-0.01**	**0.01**	**0.04**	**0.00**
			19	77+00	81+00	NB	Max.	1.46	0.32	-0.15	1.35	0.51	2.10	4.97	2.85
							Min.	-1.36	-1.21	-1.79	-0.34	-1.03	0.00	-0.37	-0.17
							Avg.	0.24	-0.37	-1.22	0.30	-0.57	0.82	1.62	1.24
							Inches	0.01	-0.01	-0.05	0.01	-0.02	0.03	0.06	0.05
						SB	Max.	0.63	0.00	2.23	-1.18	0.21	1.05	1.66	-0.50

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Min.	-1.36	-0.80	-1.94	-2.70	-0.93	-1.75	-3.13	-3.52
							Avg.	-0.37	-0.40	0.28	-2.06	-0.46	-1.14	0.22	-2.36
							Inches	-0.01	-0.02	0.01	-0.08	-0.02	-0.04	0.01	-0.09
						NB/SB Combined (in.)		**0.00**	**-0.02**	**-0.02**	**-0.03**	**-0.02**	**-0.01**	**0.04**	**-0.02**
			21	82+00	86+00	NB	Max.	1.04	0.76	-0.15	1.77	0.82	2.63	3.32	2.01
							Min.	-1.36	-0.84	-3.43	-1.47	-1.13	-0.53	0.74	0.33
							Avg.	-0.03	0.08	-1.44	0.15	-0.58	0.51	1.58	1.26
							Inches	0.00	0.00	-0.06	0.01	-0.02	0.02	0.06	0.05
						SB	Max.	2.30	0.00	1.94	0.74	1.24	2.28	2.39	1.67
							Min.	-1.04	-2.53	0.00	-2.21	-0.93	-1.75	-1.29	-3.52
							Avg.	0.29	-0.84	0.69	-1.39	-0.39	-0.51	0.50	-1.99
							Inches	0.01	-0.03	0.03	-0.05	-0.02	-0.02	0.02	-0.08
						NB/SB Combined (in.)		**0.01**	**-0.02**	**-0.01**	**-0.02**	**-0.02**	**0.00**	**0.04**	**-0.01**
			152	415+00	419+00	NB	Max.	3.28	1.06	0.64	1.37	0.86	2.69	1.75	2.20
							Min.	-2.63	-1.98	-0.95	-1.14	-0.71	-0.67	-0.82	-3.40
							Avg.	0.22	-0.42	-0.22	-0.02	-0.09	0.73	0.40	-0.66
							Inches	0.01	-0.02	-0.01	0.00	0.00	0.03	0.02	-0.03
						SB	Max.	3.50	0.00	0.88	0.23	0.71	2.15	1.05	2.00
							Min.	-1.09	-2.64	-0.88	-2.17	-1.29	-0.67	-0.47	-3.40
							Avg.	1.31	-0.53	0.37	-0.98	-0.06	0.22	0.19	0.16
							Inches	0.05	-0.02	0.01	-0.04	0.00	0.01	0.01	0.01
						NB/SB Combined (in.)		**0.03**	**-0.02**	**0.00**	**-0.02**	**0.00**	**0.02**	**0.01**	**-0.01**
			154	420+00	424+00	NB	Max.	1.60	-0.64	0.64	1.03	0.75	2.75	3.44	0.80
							Min.	-2.60	-2.55	-1.83	-0.80	-0.69	-1.92	-0.23	-3.20
							Avg.	0.42	-1.29	-0.34	0.08	0.07	1.14	0.80	-0.98
							Inches	0.02	-0.05	-0.01	0.00	0.00	0.04	0.03	-0.04
						SB	Max.	2.40	0.00	0.95	-0.69	0.55	1.78	1.26	1.00
							Min.	-1.20	-1.27	-0.24	-1.94	-0.55	-1.92	-2.30	-1.60
							Avg.	0.58	-0.25	0.33	-1.22	-0.03	0.25	0.00	-0.08
							Inches	0.02	-0.01	0.01	-0.05	0.00	0.01	0.00	0.00
						NB/SB Combined (in.)		**0.02**	**-0.03**	**0.00**	**-0.02**	**0.00**	**0.03**	**0.02**	**-0.02**
		Patch	156	425+00	429+00	NB	Max.	2.53	1.91	0.40	1.19	0.34	1.37	2.64	1.80
							Min.	-2.33	-1.91	-1.75	-1.07	-1.03	-0.14	-1.38	-2.60
							Avg.	0.00	-0.55	-0.71	-0.05	-0.38	0.37	0.94	-0.08
							Inches	0.00	-0.02	-0.03	0.00	-0.01	0.01	0.04	0.00
						SB	Max.	5.25	0.00	0.80	0.00	0.62	1.24	0.92	3.20
							Min.	-0.97	-1.27	-0.08	-2.14	-0.55	-0.55	-0.23	-0.40
							Avg.	1.67	-0.38	0.23	-1.38	-0.06	0.00	0.32	1.28
							Inches	0.07	-0.02	0.01	-0.05	0.00	0.00	0.01	0.05
						NB/SB Combined (in.)		**0.03**	**-0.02**	**-0.01**	**-0.03**	**-0.01**	**0.01**	**0.02**	**0.02**
			158	430+00	434+00	NB	Max.	2.46	0.27	1.02	0.36	0.48	2.06	1.49	1.60
							Min.	-0.95	-1.75	-1.11	-1.19	-0.62	-0.14	-0.57	-2.60
							Avg.	0.91	-0.66	-0.19	-0.53	-0.12	0.82	0.22	0.54
							Inches	0.04	-0.03	-0.01	-0.02	0.00	0.03	0.01	0.02
						SB	Max.	3.59	0.54	0.94	-0.59	0.62	2.20	1.61	1.80
							Min.	-2.08	-1.35	0.00	-2.02	-0.55	-0.82	-1.49	-3.00
							Avg.	0.62	-0.08	0.49	-1.37	-0.15	0.25	0.24	0.26
							Inches	0.02	0.00	0.02	-0.05	-0.01	0.01	0.01	0.01
						NB/SB Combined (in.)		**0.03**	**-0.01**	**0.01**	**-0.04**	**-0.01**	**0.02**	**0.01**	**0.02**
	9.0	HMA S.R.	85	249+00	253+00	NB	Max.	2.51	1.75	0.42	0.38	0.59	2.10	2.52	5.95
							Min.	-1.06	-0.88	-1.17	-1.27	-0.93	-0.28	-0.56	0.24
							Avg.	1.16	0.04	-0.35	-0.28	-0.19	0.84	0.88	2.48
							Inches	0.05	0.00	-0.01	-0.01	-0.01	0.03	0.03	0.10
						SB	Max.	1.58	0.00	1.80	0.00	0.67	1.96	0.98	-0.24

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Min.	-0.66	-1.94	-0.21	-2.04	-0.67	-0.42	-1.12	-4.76
							Avg.	0.44	-0.68	0.64	-1.09	-0.02	0.81	0.20	-2.38
							Inches	0.02	-0.03	0.03	-0.04	0.00	0.03	0.01	-0.09
						NB/SB Combined (in.)		**0.03**	**-0.01**	**0.01**	**-0.03**	**0.00**	**0.03**	**0.02**	**0.00**
			87	254+00	258+00	NB	Max.	1.98	0.00	-0.30	0.84	0.59	1.82	1.54	3.33
							Min.	-1.85	-1.10	-1.30	-1.21	-1.01	-0.14	0.00	-1.90
							Avg.	0.22	-0.56	-1.00	-0.70	-0.36	0.62	0.66	1.40
							Inches	0.01	-0.02	-0.04	-0.03	-0.01	0.02	0.03	0.06
						SB	Max.	1.72	0.00	2.10	-0.12	1.01	2.10	1.54	1.43
							Min.	-1.72	-2.00	-0.30	-1.57	-0.67	-1.68	-1.96	-5.24
							Avg.	0.00	-0.70	0.60	-1.13	-0.16	0.10	0.39	-2.26
							Inches	0.00	-0.03	0.02	-0.04	-0.01	0.00	0.02	-0.09
						NB/SB Combined (in.)		**0.00**	**-0.02**	**-0.01**	**-0.04**	**-0.01**	**0.01**	**0.02**	**-0.02**
			91	265+00	269+00	NB	Max.	1.78	0.50	-0.20	1.02	0.63	2.88	2.19	6.00
							Min.	-2.14	-1.50	-1.40	-2.04	-0.79	-0.41	-1.60	1.11
							Avg.	0.57	-0.36	-0.86	-0.50	-0.25	0.92	0.50	2.98
							Inches	0.02	-0.01	-0.03	-0.02	-0.01	0.04	0.02	0.12
						SB	Max.	1.54	0.00	1.40	0.64	0.71	1.51	1.02	-1.56
							Min.	-1.31	-1.00	0.00	-2.04	-0.63	-0.41	-1.02	-3.78
							Avg.	0.23	-0.40	0.44	-0.98	0.08	0.27	0.20	-2.51
							Inches	0.01	-0.02	0.02	-0.04	0.00	0.01	0.01	-0.10
						NB/SB Combined (in.)		**0.02**	**-0.01**	**-0.01**	**-0.03**	**0.00**	**0.02**	**0.01**	**0.01**
			93	270+00	274+00	NB	Max.	2.97	0.00	0.30	1.24	1.02	2.88	2.92	4.89
							Min.	-1.66	-1.57	-1.28	-1.10	-0.63	-0.27	-0.73	1.56
							Avg.	0.96	-0.29	-0.86	-0.16	-0.03	1.14	1.46	3.38
							Inches	0.04	-0.01	-0.03	-0.01	0.00	0.04	0.06	0.13
						SB	Max.	2.37	0.00	1.68	0.00	0.55	1.65	1.46	-1.56
							Min.	-0.95	-2.41	0.00	-2.61	-0.63	-0.41	-0.44	-4.67
							Avg.	0.66	-0.84	0.50	-1.54	-0.15	0.45	0.41	-2.98
							Inches	0.03	-0.03	0.02	-0.06	-0.01	0.02	0.02	-0.12
						NB/SB Combined (in.)		**0.03**	**-0.02**	**-0.01**	**-0.03**	**0.00**	**0.03**	**0.04**	**0.01**
No	4.5		23	87+00	91+00	NB	Max.	2.69	1.05	0.15	2.22	1.24	3.15	4.24	3.18
							Min.	-0.81	-1.05	-2.09	-0.48	-0.82	-1.75	-1.47	-0.50
							Avg.	0.97	-0.18	-1.37	0.60	-0.01	1.40	0.90	1.04
							Inches	0.04	-0.01	-0.05	0.02	0.00	0.06	0.04	0.04
						SB	Max.	4.85	0.00	1.34	-0.79	1.24	1.40	3.13	-0.50
							Min.	-1.35	-0.88	-2.23	-4.12	-0.93	-1.75	-1.47	-3.52
							Avg.	0.40	-0.35	0.13	-2.07	-0.09	-0.42	0.68	-2.23
							Inches	0.02	-0.01	0.01	-0.08	0.00	-0.02	0.03	-0.09
						NB/SB Combined (in.)		**0.03**	**-0.01**	**-0.02**	**-0.03**	**0.00**	**0.02**	**0.03**	**-0.02**
		Scarify	25	92+00	96+00	NB	Max.	3.50	0.85	-0.29	2.38	0.19	2.67	4.24	5.34
							Min.	-2.42	-0.34	-2.04	-0.48	-1.17	-0.83	-3.32	0.00
							Avg.	0.22	0.28	-1.11	0.98	-0.47	0.92	0.66	2.28
							Inches	0.01	0.01	-0.04	0.04	-0.02	0.04	0.03	0.09
						SB	Max.	4.04	0.00	1.31	-0.63	0.49	0.33	6.45	-0.85
							Min.	-2.69	-0.85	-1.60	-3.01	-0.97	-1.67	-0.37	-3.84
							Avg.	1.29	-0.26	0.04	-1.85	-0.27	-0.88	1.92	-2.30
							Inches	0.05	-0.01	0.00	-0.07	-0.01	-0.03	0.08	-0.09
						NB/SB Combined (in.)		**0.03**	**0.00**	**-0.02**	**-0.02**	**-0.01**	**0.00**	**0.05**	**0.00**
		HMA S.R.	95	275+00	279+00	NB	Max.	1.17	0.00	0.39	0.74	0.47	2.61	2.19	4.22
							Min.	-0.93	-1.13	-1.17	-1.23	-0.71	-0.27	-0.44	-0.22
							Avg.	0.22	-0.23	-0.37	-0.66	-0.18	0.63	0.48	1.96
							Inches	0.01	-0.01	-0.01	-0.03	-0.01	0.02	0.02	0.08
						SB	Max.	1.40	0.00	0.88	0.37	0.55	1.65	1.75	-0.67

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Min.	-1.17	-1.13	-0.19	-2.21	-0.63	-0.55	-0.58	-4.22
							Avg.	0.29	-0.56	0.35	-1.22	-0.32	0.10	0.41	-1.93
							Inches	0.01	-0.02	0.01	-0.05	-0.01	0.00	0.02	-0.08
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.00**	**-0.04**	**-0.01**	**0.01**	**0.02**	**0.00**
			98	280+00	284+00	NB	Max.	1.63	0.41	0.62	0.98	0.54	1.84	3.35	4.15
							Min.	-1.40	-1.44	-1.24	-1.23	-0.70	-0.37	0.00	0.80
							Avg.	0.36	-0.54	-0.67	-0.49	-0.24	0.52	0.69	1.44
							Inches	0.01	-0.02	-0.03	-0.02	-0.01	0.02	0.03	0.06
						SB	Max.	0.82	0.00	0.00	0.86	0.78	1.72	2.04	0.80
							Min.	-0.58	-1.03	0.00	-2.21	-0.62	-1.11	-0.88	-2.71
							Avg.	-0.02	-0.10	0.00	-0.91	-0.19	0.29	0.28	-1.18
							Inches	0.00	0.00	0.00	-0.04	-0.01	0.01	0.01	-0.05
						NB/SB Combined (in.)		**0.01**	**-0.01**	**-0.01**	**-0.03**	**-0.01**	**0.02**	**0.02**	**0.01**
			160	435+00	439+00	NB	Max.	1.89	0.53	0.51	1.66	0.48	3.16	2.64	1.00
							Min.	-1.89	-2.11	-1.11	-0.95	-0.69	-0.14	-0.57	-6.00
							Avg.	0.04	-0.54	-0.20	0.11	-0.30	1.21	0.69	-1.40
							Inches	0.00	-0.02	-0.01	0.00	-0.01	0.05	0.03	-0.06
						SB	Max.	0.57	0.00	0.94	-0.36	0.55	1.92	0.92	1.20
							Min.	-2.46	-1.32	-0.09	-2.14	-0.55	-0.55	-1.15	-2.20
							Avg.	-1.02	-0.66	0.40	-1.54	-0.16	0.32	-0.02	0.10
							Inches	-0.04	-0.03	0.02	-0.06	-0.01	0.01	0.00	0.00
						NB/SB Combined (in.)		**-0.02**	**-0.02**	**0.00**	**-0.03**	**-0.01**	**0.03**	**0.01**	**-0.03**
		Patch													
			162	440+00	444+00	NB	Max.	2.92	0.54	0.09	1.19	0.57	3.16	2.64	1.40
							Min.	-1.17	-1.08	-1.11	-0.95	-0.71	-0.14	-0.57	-3.60
							Avg.	1.28	-0.43	-0.80	0.64	-0.11	0.97	0.83	-0.70
							Inches	0.05	-0.02	-0.03	0.03	0.00	0.04	0.03	-0.03
						SB	Max.	1.17	0.00	1.20	0.95	0.64	1.37	1.72	2.00
							Min.	-2.92	-1.35	-0.43	-2.26	-0.64	-1.78	-1.95	-1.60
							Avg.	-0.21	-0.13	0.44	-1.45	-0.31	0.10	0.36	0.60
							Inches	-0.01	-0.01	0.02	-0.06	-0.01	0.00	0.01	0.02
						NB/SB Combined (in.)		**0.02**	**-0.01**	**-0.01**	**-0.02**	**-0.01**	**0.02**	**0.02**	**0.00**
			89	259+75	263+25	NB	Max.	1.90	0.63	0.29	0.38	0.24	1.24	2.19	2.67
							Min.	-1.90	-1.04	-0.97	-1.02	-0.87	-2.06	-0.29	0.22
							Avg.	0.18	-0.42	-0.29	-0.27	-0.17	0.04	0.64	1.60
							Inches	0.01	-0.02	-0.01	-0.01	-0.01	0.00	0.03	0.06
						SB	Max.	1.90	0.00	1.36	-0.76	0.71	1.65	1.31	0.67
							Min.	-2.14	-1.04	-0.78	-2.16	-1.49	-0.41	-0.58	-4.00
							Avg.	0.24	-0.63	0.38	-1.63	-0.36	0.47	0.35	-2.11
							Inches	0.01	-0.02	0.01	-0.06	-0.01	0.02	0.01	-0.08
						NB/SB Combined		**0.01**	**-0.02**	**0.00**	**-0.04**	**-0.01**	**0.01**	**0.02**	**-0.01**
	6.0	Scarify													
			27	97+00	101+00	NB	Max.	2.59	0.92	0.15	1.53	0.58	2.83	4.05	4.70
							Min.	-2.59	-0.83	-3.72	-1.07	-1.94	-0.50	0.37	0.00
							Avg.	0.13	-0.20	-1.40	0.11	-0.86	1.02	1.73	2.20
							Inches	0.01	-0.01	-0.06	0.00	-0.03	0.04	0.07	0.09
						SB	Max.	0.52	0.00	1.19	0.76	0.88	0.00	3.13	-1.71
							Min.	-3.89	-0.83	-1.34	-2.29	-1.07	-2.00	-1.47	-4.48
							Avg.	-0.80	-0.33	0.03	-1.56	-0.22	-0.92	1.07	-3.03
							Inches	-0.03	-0.01	0.00	-0.06	-0.01	-0.04	0.04	-0.12
						NB/SB Combined		**-0.01**	**-0.01**	**-0.03**	**-0.03**	**-0.02**	**0.00**	**0.06**	**-0.02**
			29	102+00	106+00	NB	Max.	0.63	0.00	0.30	2.02	1.03	4.03	4.24	3.85
							Min.	-1.57	-2.33	-2.09	-1.69	-1.03	-0.70	0.55	0.84
							Avg.	-0.18	-0.68	-0.92	-0.03	-0.21	0.89	2.49	2.31
							Inches	-0.01	-0.03	-0.04	0.00	-0.01	0.04	0.10	0.09
						SB	Max.	1.15	0.80	1.79	0.00	0.82	1.75	2.39	-0.84

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Min.	-1.04	-0.80	-1.34	-3.37	-1.24	-2.98	-0.55	-3.01
							Avg.	0.16	-0.24	0.80	-1.59	-0.26	-0.61	0.46	-1.74
							Inches	0.01	-0.01	0.03	-0.06	-0.01	-0.02	0.02	-0.07
						NB/SB Combined		**0.00**	**-0.02**	**0.00**	**-0.03**	**-0.01**	**0.01**	**0.06**	**0.01**
		HMA S.R.	100	285+00	289+00	NB	Max.	1.40	-0.31	-0.29	1.27	0.54	2.09	2.19	3.51
							Min.	-1.05	-1.03	-1.17	-1.15	-0.86	-1.72	-0.73	-0.48
							Avg.	0.05	-0.71	-0.81	-0.50	-0.19	0.39	0.45	1.47
							Inches	0.00	-0.03	-0.03	-0.02	-0.01	0.02	0.02	0.06
						SB	Max.	0.93	0.00	0.97	-0.13	0.39	1.47	0.58	0.80
							Min.	-0.47	-1.03	-0.19	-2.04	-0.62	-0.37	-1.31	-3.19
							Avg.	0.37	-0.62	0.30	-1.07	-0.24	0.42	-0.19	-1.29
							Inches	0.01	-0.02	0.01	-0.04	-0.01	0.02	-0.01	-0.05
						NB/SB Combined		**0.01**	**-0.03**	**-0.01**	**-0.03**	**-0.01**	**0.02**	**0.01**	**0.00**
			102	290+00	294+00	NB	Max.	3.27	0.64	0.09	2.17	0.39	1.96	3.65	4.46
							Min.	-0.58	-0.95	-1.14	-1.21	-0.86	0.00	-0.29	0.32
							Avg.	0.23	-0.54	-0.46	0.17	-0.23	0.74	1.17	2.36
							Inches	0.01	-0.02	-0.02	0.01	-0.01	0.03	0.05	0.09
						SB	Max.	1.75	0.00	1.70	0.97	0.31	1.47	1.02	-0.48
							Min.	-1.17	-1.06	-0.19	-1.57	-0.70	-0.37	-1.17	-2.71
							Avg.	0.12	-0.32	0.43	-0.71	-0.40	0.29	0.00	-1.44
							Inches	0.00	-0.01	0.02	-0.03	-0.02	0.01	0.00	-0.06
						NB/SB Combined		**0.01**	**-0.02**	**0.00**	**-0.01**	**-0.01**	**0.02**	**0.02**	**0.02**
		Patch	164	445+00	449+00	NB	Max.	2.28	0.27	0.41	1.19	0.85	3.16	2.64	2.09
							Min.	-2.28	-2.75	-0.99	-0.95	-0.71	-0.41	-0.57	-2.68
							Avg.	-0.11	-1.28	-0.34	0.12	-0.05	0.89	0.26	0.12
							Inches	0.00	-0.05	-0.01	0.00	0.00	0.04	0.01	0.00
						SB	Max.	1.93	0.00	1.07	-0.83	0.78	2.33	0.69	1.04
							Min.	-3.85	-1.37	-0.08	-2.14	-0.57	-0.41	-1.84	-1.79
							Avg.	-0.30	-0.27	0.41	-1.58	0.04	0.81	-0.36	-0.30
							Inches	-0.01	-0.01	0.02	-0.06	0.00	0.03	-0.01	-0.01
						NB/SB Combined		**-0.01**	**-0.03**	**0.00**	**-0.03**	**0.00**	**0.03**	**0.00**	**0.00**
			166	450+00	454+00	NB	Max.	3.05	0.67	0.41	1.31	0.42	2.06	1.15	1.79
							Min.	-5.21	-2.02	-0.66	-0.95	-0.71	-0.41	-0.69	-1.94
							Avg.	-0.11	-0.48	0.12	-0.08	-0.03	0.99	0.10	-0.13
							Inches	0.00	-0.02	0.00	0.00	0.00	0.04	0.00	-0.01
						SB	Max.	2.69	0.00	4.12	2.38	0.57	1.65	0.80	2.68
							Min.	-1.62	-1.35	-0.16	-2.14	-0.78	-0.55	-1.49	-1.64
							Avg.	0.11	-0.54	1.09	-0.75	-0.12	0.36	-0.03	0.27
							Inches	0.00	-0.02	0.04	-0.03	0.00	0.01	0.00	0.01
						NB/SB Combined		**0.00**	**-0.02**	**0.02**	**-0.02**	**0.00**	**0.03**	**0.00**	**0.00**

Table B.2. Fault data for overlay 4.5 in. thick

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
A	4.5	Scarify	34	120+00	124+00	NB	Max.	0.84	0.61	0.28	1.43	0.70	3.23	3.59	7.06
							Min.	-1.25	-2.01	-1.96	-0.48	-1.00	-0.54	0.51	0.92
							Avg.	-0.03	-0.20	-1.02	0.02	-0.41	0.67	1.55	3.29
							Inches	0.00	-0.01	-0.04	0.00	-0.02	0.03	0.06	0.13
						SB	Max.	0.42	0.00	1.26	0.64	0.50	1.62	1.54	-0.92
							Min.	-0.94	-0.88	0.28	-2.86	-1.20	-2.42	-2.22	-5.83
							Avg.	-0.31	-0.18	0.63	-1.94	-0.42	-0.59	0.02	-3.35
							Inches	-0.01	-0.01	0.02	-0.08	-0.02	-0.02	0.00	-0.13
						NB/SB Combined (in.)		**-0.01**	**-0.01**	**-0.01**	**-0.04**	**-0.02**	**0.00**	**0.03**	**0.00**
			36	125+00	129+00	NB	Max.	0.73	0.58	0.00	2.00	0.80	4.31	3.41	6.75
							Min.	-0.42	-0.96	-1.92	-0.46	-0.80	-0.27	-1.02	0.00
							Avg.	0.05	-0.33	-1.14	0.54	-0.23	1.72	0.84	3.13
							Inches	0.00	-0.01	-0.04	0.02	-0.01	0.07	0.03	0.12
						SB	Max.	1.57	0.96	1.65	0.00	0.20	-0.27	1.54	-0.92
							Min.	-0.31	-0.96	-0.55	-2.76	-1.00	-2.69	-0.51	-6.45
							Avg.	0.47	-0.29	0.58	-1.35	-0.52	-1.59	0.92	-4.97
							Inches	0.02	-0.01	0.02	-0.05	-0.02	-0.06	0.04	-0.20
						NB/SB Combined (in.)		**0.01**	**-0.01**	**-0.01**	**-0.02**	**-0.01**	**0.00**	**0.03**	**-0.04**
		HMA S.R.	104	295+00	299+00	NB	Max.	2.45	0.21	0.38	0.12	0.62	2.21	3.50	3.67
							Min.	-1.17	-1.57	-1.14	-1.17	-0.86	-0.25	0.00	-0.32
							Avg.	0.07	-0.57	-0.85	-0.41	-0.25	0.68	1.41	1.39
							Inches	0.00	-0.02	-0.03	-0.02	-0.01	0.03	0.06	0.05
						SB	Max.	0.82	1.04	1.61	0.70	0.08	1.23	1.90	-0.16
							Min.	-0.93	-1.04	-1.04	-2.10	-0.62	-0.37	-0.15	-3.35
							Avg.	-0.04	-0.10	0.29	-0.71	-0.41	0.14	0.77	-1.47
							Inches	0.00	0.00	0.01	-0.03	-0.02	0.01	0.03	-0.06
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.01**	**-0.02**	**-0.01**	**0.02**	**0.04**	**0.00**
			106	300+00	304+00	NB	Max.	1.61	0.20	0.64	0.58	0.57	2.02	3.43	2.05
							Min.	-1.72	-1.60	-1.73	-2.10	-0.64	-0.67	-0.69	0.00
							Avg.	0.52	-0.67	-0.43	-0.75	-0.11	0.07	0.55	1.23
							Inches	0.02	-0.03	-0.02	-0.03	0.00	0.00	0.02	0.05
						SB	Max.	0.80	0.00	0.55	0.58	0.43	1.08	0.96	-0.17
							Min.	-1.38	-1.00	-0.18	-1.98	-0.64	-0.40	-0.41	-3.25
							Avg.	-0.10	-0.30	0.21	-1.13	-0.20	0.32	0.40	-1.75
							Inches	0.00	-0.01	0.01	-0.04	-0.01	0.01	0.02	-0.07
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.00**	**-0.04**	**-0.01**	**0.01**	**0.02**	**-0.01**
		Patch	168	455+00	459+00	NB	Max.	0.00	0.00	0.00	0.00	0.28	3.16	0.92	1.49
							Min.	0.00	0.00	0.00	0.00	-0.70	0.00	-1.49	-3.72
							Avg.	0.00	0.00	0.00	0.00	-0.14	1.37	-0.24	-0.66
							Inches	0.00	0.00	0.00	0.00	-0.01	0.05	-0.01	-0.03
						SB	Max.	0.00	0.00	0.00	0.00	0.14	1.92	2.64	1.64
							Min.	0.00	0.00	0.00	0.00	-0.56	-1.37	-0.11	0.00
							Avg.	0.00	0.00	0.00	0.00	-0.22	0.14	0.99	0.71
							Inches	0.00	0.00	0.00	0.00	-0.01	0.01	0.04	0.03
						NB/SB Combined (in.)		**0.00**	**0.00**	**0.00**	**0.00**	**-0.01**	**0.03**	**0.01**	**0.00**
			170	459+50	463+50	NB	Max.	1.67	0.94	0.82	1.31	0.84	2.02	0.90	1.04
							Min.	-0.91	-3.63	-1.56	-2.14	-0.70	-0.40	-1.92	-2.23
							Avg.	0.32	-0.65	-0.33	-0.37	-0.01	0.62	0.14	-0.16
							Inches	0.01	-0.03	-0.01	-0.01	0.00	0.02	0.01	-0.01
						SB	Max.	2.74	0.00	1.89	0.00	0.70	1.48	1.24	2.23
							Min.	-1.98	-1.35	-0.66	-2.38	-0.42	-0.27	-1.24	-1.34
							Avg.	0.21	-0.40	0.42	-1.26	0.09	0.61	0.25	0.51
							Inches	0.01	-0.02	0.02	-0.05	0.00	0.02	0.01	0.02

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.00**	**-0.03**	**0.00**	**0.02**	**0.01**	**0.01**
						NB	Max.	0.21	0.53	-0.57	1.77	0.70	2.42	2.56	4.61
							Min.	-0.73	-1.05	-2.00	-0.48	-1.00	-3.77	-0.34	-2.76
							Avg.	-0.24	-0.46	-1.44	0.37	-0.21	0.65	0.90	2.36
							Inches	-0.01	-0.02	-0.06	0.01	-0.01	0.03	0.04	0.09
			38	130+00	134+00	SB	Max.	0.84	0.00	1.57	-0.32	0.70	2.69	1.88	3.07
							Min.	-1.25	-0.88	-0.29	-2.90	-0.80	-2.42	-2.39	-5.22
							Avg.	0.00	-0.44	0.63	-1.34	-0.22	-0.19	0.07	-2.70
							Inches	0.00	-0.02	0.02	-0.05	-0.01	-0.01	0.00	-0.11
						NB/SB Combined (in.)		**0.00**	**-0.02**	**-0.02**	**-0.02**	**-0.01**	**0.01**	**0.02**	**-0.01**
		Scarify				NB	Max.	0.42	0.44	-0.91	3.06	0.65	2.60	3.68	3.43
							Min.	-1.57	-0.62	-3.24	-0.16	-0.93	-2.12	-0.92	-2.20
							Avg.	-0.45	-0.33	-1.79	1.19	-0.50	0.33	1.33	1.15
							Inches	-0.02	-0.01	-0.07	0.05	-0.02	0.01	0.05	0.05
			40	135+00	139+00	SB	Max.	0.73	0.89	1.94	-1.77	0.65	1.30	2.76	1.71
							Min.	-0.63	-0.89	-1.81	-2.90	-1.59	-1.79	-1.66	-5.14
							Avg.	-0.06	0.00	-0.21	-2.43	-0.48	-0.29	0.42	-2.89
							Inches	0.00	0.00	-0.01	-0.10	-0.02	-0.01	0.02	-0.11
						NB/SB Combined (in.)		**-0.01**	**-0.01**	**-0.04**	**-0.02**	**-0.02**	**0.00**	**0.03**	**-0.03**
						NB	Max.	0.80	0.21	0.27	1.05	0.57	2.02	1.51	3.94
							Min.	-1.03	-2.37	-1.09	-1.05	-0.57	-0.27	-0.69	-1.37
							Avg.	-0.13	-0.69	-0.54	-0.07	0.06	0.73	-0.08	1.37
							Inches	0.00	-0.03	-0.02	0.00	0.00	0.03	0.00	0.05
			108	305+00	309+00	SB	Max.	0.92	0.00	1.55	-0.70	0.36	2.42	0.82	-0.34
							Min.	-1.49	-1.03	-0.18	-2.10	-0.57	-1.08	0.00	-3.59
							Avg.	0.18	-0.31	0.34	-1.48	-0.21	0.43	0.38	-2.07
							Inches	0.01	-0.01	0.01	-0.06	-0.01	0.02	0.02	-0.08
						NB/SB Combined (in.)		**0.00**	**-0.02**	**0.00**	**-0.03**	**0.00**	**0.02**	**0.01**	**-0.01**
	6.0	HMA S.R.				NB	Max.	1.92	0.73	0.72	0.58	0.36	2.29	1.51	2.57
							Min.	-1.13	-0.84	-0.90	-1.17	-0.71	-0.40	-0.55	-0.17
							Avg.	0.26	-0.25	-0.30	-0.35	-0.20	0.65	0.40	1.39
							Inches	0.01	-0.01	-0.01	-0.01	-0.01	0.03	0.02	0.05
			110	310+00	314+00	SB	Max.	0.79	0.00	1.53	-1.28	0.14	1.62	2.47	-0.17
							Min.	-1.13	-1.04	-0.09	-2.10	-0.57	-0.40	-0.41	-3.59
							Avg.	0.06	-0.63	0.50	-1.72	-0.24	0.63	0.88	-2.22
							Inches	0.00	-0.02	0.02	-0.07	-0.01	0.02	0.03	-0.09
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.00**	**-0.04**	**-0.01**	**0.03**	**0.03**	**-0.02**
						NB	Max.	1.87	0.54	0.41	1.43	0.56	2.69	1.69	2.53
							Min.	-1.87	-1.88	-1.07	-1.43	-1.33	-0.40	-2.15	-2.68
							Avg.	-0.23	-0.55	-0.33	-0.15	-0.17	1.00	0.24	-0.27
							Inches	-0.01	-0.02	-0.01	-0.01	-0.01	0.04	0.01	-0.01
			172	464+00	468+00	SB	Max.	1.87	0.00	1.40	-1.55	0.07	0.81	0.90	1.49
							Min.	-3.58	-2.69	-0.58	-2.14	-1.05	-0.40	-0.79	-0.15
							Avg.	-0.87	-0.40	0.36	-1.81	-0.26	0.38	0.20	0.54
							Inches	-0.03	-0.02	0.01	-0.07	-0.01	0.01	0.01	0.02
						NB/SB Combined (in.)		**-0.02**	**-0.02**	**0.00**	**-0.04**	**-0.01**	**0.03**	**0.01**	**0.01**
		Patch				NB	Max.	1.87	-0.42	0.74	0.83	0.49	2.15	2.60	1.64
							Min.	-1.71	-2.80	-1.07	-1.07	-0.70	0.00	-1.58	-2.83
							Avg.	0.08	-1.44	-0.38	-0.04	0.01	1.02	0.42	-0.12
							Inches	0.00	-0.06	-0.01	0.00	0.00	0.04	0.02	0.00
			174	468+50	472+50	SB	Max.	1.56	0.00	1.48	0.24	0.77	1.35	0.56	1.04
							Min.	-0.93	0.00	-0.16	-1.79	-0.56	-0.40	-0.45	-0.74
							Avg.	0.11	0.00	0.56	-1.19	0.11	0.43	0.11	0.45
							Inches	0.00	0.00	0.02	-0.05	0.00	0.02	0.00	0.02
						NB/SB Combined (in.)		**0.00**	**-0.03**	**0.00**	**-0.02**	**0.00**	**0.03**	**0.01**	**0.01**

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
B															
						NB	Max.	0.94	0.62	-0.41	1.29	0.75	2.44	4.24	5.14
							Min.	-1.04	-0.71	-1.92	-0.48	-1.12	-2.12	0.00	-0.24
							Avg.	0.00	-0.19	-0.93	0.19	-0.29	0.23	1.38	2.18
							Inches	0.00	-0.01	-0.04	0.01	-0.01	0.01	0.05	0.09
			42	140+00	144+00	SB	Max.	0.73	0.00	2.20	0.80	1.49	3.91	1.84	2.45
							Min.	-0.73	-0.89	-2.06	-3.06	-1.40	-2.77	-3.68	-5.14
							Avg.	0.10	-0.35	0.01	-1.85	-0.19	-0.20	0.06	-2.13
							Inches	0.00	-0.01	0.00	-0.07	-0.01	-0.01	0.00	-0.08
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.02**	**-0.03**	**-0.01**	**0.00**	**0.03**	**0.00**
		Scarify				NB	Max.	0.84	0.00	-0.14	1.77	0.28	2.44	4.05	4.16
							Min.	-1.99	-0.97	-1.92	-0.64	-0.93	0.00	0.18	1.22
							Avg.	-0.09	-0.39	-1.03	0.45	-0.54	0.60	1.66	1.98
							Inches	0.00	-0.02	-0.04	0.02	-0.02	0.02	0.07	0.08
			44	145+00	149+00	SB	Max.	0.63	0.00	1.92	0.00	0.65	0.65	2.95	-0.73
							Min.	-0.84	0.00	-0.41	-3.22	-0.84	-1.63	-0.55	-5.14
							Avg.	-0.07	0.00	0.38	-1.46	-0.44	-0.63	0.88	-2.47
							Inches	0.00	0.00	0.02	-0.06	-0.02	-0.02	0.03	-0.10
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.01**	**-0.02**	**-0.02**	**0.00**	**0.05**	**-0.01**
						NB	Max.	1.02	0.53	0.72	0.35	0.43	2.02	3.43	2.74
							Min.	-0.79	-1.38	-1.08	-0.93	-0.71	-0.81	-0.69	0.86
							Avg.	0.18	-0.58	-0.42	-0.29	-0.24	0.40	0.54	1.68
							Inches	0.01	-0.02	-0.02	-0.01	-0.01	0.02	0.02	0.07
			112	315+00	319+00	SB	Max.	0.56	0.00	0.90	0.12	0.57	1.75	0.96	0.00
							Min.	-1.35	-1.06	-0.18	-1.97	-0.57	-0.54	-1.51	-3.08
							Avg.	-0.19	-0.21	0.33	-1.01	-0.02	0.62	-0.15	-1.18
							Inches	-0.01	-0.01	0.01	-0.04	0.00	0.02	-0.01	-0.05
						NB/SB Combined (in.)		**0.00**	**-0.02**	**0.00**	**-0.03**	**-0.01**	**0.02**	**0.01**	**0.01**
	4.5	HMA S.R.				NB	Max.	1.35	1.04	0.36	1.16	0.21	1.24	1.19	2.82
							Min.	-0.68	-1.25	-1.17	-1.16	-0.63	-0.41	0.00	0.74
							Avg.	0.14	0.16	-0.39	-0.34	-0.18	0.62	0.19	1.51
							Inches	0.01	0.01	-0.02	-0.01	-0.01	0.02	0.01	0.06
			114	320+00	324+00	SB	Max.	1.13	0.00	1.26	0.00	0.56	1.92	1.19	0.15
							Min.	-1.58	-1.04	-0.09	-1.85	-0.42	-0.41	-1.19	-2.67
							Avg.	-0.11	-0.31	0.53	-1.03	0.01	0.80	0.06	-1.08
							Inches	0.00	-0.01	0.02	-0.04	0.00	0.03	0.00	-0.04
						NB/SB Combined (in.)		**0.00**	**0.00**	**0.00**	**-0.03**	**0.00**	**0.03**	**0.00**	**0.01**
						NB	Max.	2.43	0.89	-0.25	0.24	0.35	1.21	2.71	1.11
							Min.	-1.22	-2.29	-1.89	-1.07	-0.56	-1.35	-0.56	-1.60
							Avg.	0.33	-0.64	-1.06	-0.64	-0.13	0.15	0.59	-0.06
							Inches	0.01	-0.03	-0.04	-0.03	-0.01	0.01	0.02	0.00
			176	473+00	477+00	SB	Max.	0.30	0.00	1.48	-0.60	0.21	0.81	1.47	1.72
							Min.	-2.43	-1.27	-0.91	-1.90	-0.56	-1.48	-1.47	0.00
							Avg.	-0.53	-0.25	0.29	-1.43	-0.22	-0.05	0.23	0.69
							Inches	-0.02	-0.01	0.01	-0.06	-0.01	0.00	0.01	0.03
						NB/SB Combined (in.)		**0.00**	**-0.02**	**-0.02**	**-0.04**	**-0.01**	**0.00**	**0.02**	**0.01**
		Patch				NB	Max.	0.95	0.65	0.16	0.36	0.21	2.02	1.69	3.07
							Min.	-2.23	-2.33	-1.73	-1.69	-1.04	-1.88	-1.13	-0.61
							Avg.	-0.56	-0.69	-0.62	-0.74	-0.24	0.38	0.16	1.22
							Inches	-0.02	-0.03	-0.02	-0.03	-0.01	0.01	0.01	0.05
			178	477+50	481+50	SB	Max.	3.18	0.00	0.91	-1.69	0.21	0.81	1.24	-0.86
							Min.	-3.18	-1.30	-0.16	-2.18	-1.11	-1.08	-0.79	-2.33
							Avg.	0.00	-0.13	0.17	-1.97	-0.26	0.39	0.37	-1.98
							Inches	0.00	-0.01	0.01	-0.08	-0.01	0.02	0.01	-0.08
						NB/SB Combined (in.)		**-0.01**	**-0.02**	**-0.01**	**-0.05**	**-0.01**	**0.02**	**0.01**	**-0.01**
	6.0	Scarify	46	150+00	154+00	NB	Max.	0.31	0.27	0.63	1.93	0.47	1.63	4.79	4.65
							Min.	-1.57	-0.89	-2.50	-0.48	-2.15	-0.49	-0.92	-0.73

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Avg.	-0.53	-0.28	-0.96	0.61	-0.47	0.55	2.08	2.40
							Inches	-0.02	-0.01	-0.04	0.02	-0.02	0.02	0.08	0.09
						SB	Max.	0.52	0.00	1.38	-0.64	0.09	0.49	2.21	-0.24
							Min.	-0.73	0.00	-0.25	-3.06	-0.75	-1.63	-0.92	-3.92
							Avg.	0.04	0.00	0.36	-1.98	-0.49	-0.65	0.48	-2.03
							Inches	0.00	0.00	0.01	-0.08	-0.02	-0.03	0.02	-0.08
						NB/SB Combined (in.)		**-0.01**	**-0.01**	**-0.01**	**-0.03**	**-0.02**	**0.00**	**0.05**	**0.01**
						NB	Max.	1.15	0.36	0.38	1.93	0.52	2.92	4.27	4.82
							Min.	-3.13	-1.18	-1.75	-0.48	-0.95	-0.78	0.17	0.51
							Avg.	-0.37	-0.65	-0.95	0.35	-0.35	0.60	1.60	2.16
							Inches	-0.01	-0.03	-0.04	0.01	-0.01	0.02	0.06	0.08
			48	155+00	159+00	SB	Max.	0.52	0.00	1.00	-1.13	0.09	1.36	2.05	-0.76
							Min.	-1.25	-0.91	-0.38	-2.90	-0.69	-0.58	-0.68	-5.33
							Avg.	-0.60	-0.27	0.09	-2.04	-0.20	0.06	0.65	-3.07
							Inches	-0.02	-0.01	0.00	-0.08	-0.01	0.00	0.03	-0.12
						NB/SB Combined (in.)		**-0.02**	**-0.02**	**-0.02**	**-0.03**	**-0.01**	**0.01**	**0.04**	**-0.02**
		HMA S.R.				NB	Max.	1.58	0.82	-0.27	0.58	1.05	2.61	3.43	4.15
							Min.	-1.35	-3.09	-1.26	-1.04	-0.70	-0.41	0.00	-0.15
							Avg.	-0.10	-0.72	-0.76	-0.10	-0.06	1.37	1.49	1.88
							Inches	0.00	-0.03	-0.03	0.00	0.00	0.05	0.06	0.07
			116	325+00	329+00	SB	Max.	1.13	0.00	0.90	0.00	0.28	1.65	1.94	0.44
							Min.	-2.03	-1.03	-0.18	-1.97	-0.63	-0.41	-4.47	-2.67
							Avg.	-0.05	-0.41	0.19	-1.05	-0.25	0.45	-0.60	-1.10
							Inches	0.00	-0.02	0.01	-0.04	-0.01	0.02	-0.02	-0.04
						NB/SB Combined (in.)		**0.00**	**-0.02**	**-0.01**	**-0.02**	**-0.01**	**0.04**	**0.02**	**0.02**
						NB	Max.	0.84	0.31	0.27	1.39	0.49	2.06	3.28	3.41
							Min.	-0.60	-1.15	-1.17	-1.16	-0.77	0.00	-0.74	0.74
							Avg.	-0.04	-0.63	-0.65	-0.53	-0.18	0.88	0.77	1.51
							Inches	0.00	-0.02	-0.03	-0.02	-0.01	0.03	0.03	0.06
			118	330+00	334+00	SB	Max.	1.45	0.00	1.26	-1.04	0.28	1.51	1.49	-0.89
							Min.	-0.36	-1.04	-0.18	-1.97	-0.63	-0.55	-0.60	-2.82
							Avg.	0.43	-0.42	0.38	-1.41	-0.39	0.33	0.18	-1.47
							Inches	0.02	-0.02	0.01	-0.06	-0.02	0.01	0.01	-0.06
						NB/SB Combined (in.)		**0.01**	**-0.02**	**-0.01**	**-0.04**	**-0.01**	**0.02**	**0.02**	**0.00**
		Patch				NB	Max.	2.74	0.54	0.65	1.45	0.55	3.10	3.05	3.32
							Min.	-1.98	-2.42	-0.98	-0.97	-0.55	0.27	-0.11	0.00
							Avg.	0.35	-1.09	0.03	0.01	0.10	1.39	1.22	2.06
							Inches	0.01	-0.04	0.00	0.00	0.00	0.05	0.05	0.08
			180	482+00	486+00	SB	Max.	3.04	0.00	1.47	-0.73	0.55	0.27	1.13	-0.61
							Min.	-0.76	-1.35	0.00	-3.51	-1.18	-1.62	0.00	-2.58
							Avg.	1.00	-0.13	0.63	-1.61	-0.28	-0.34	0.37	-1.65
							Inches	0.04	-0.01	0.02	-0.06	-0.01	-0.01	0.01	-0.06
						NB/SB Combined (in.)		**0.03**	**-0.02**	**0.01**	**-0.03**	**0.00**	**0.02**	**0.03**	**0.01**
						NB	Max.	2.74	0.67	0.33	0.97	0.69	2.02	2.82	3.44
							Min.	-2.89	-2.15	-1.00	-2.06	-0.69	-1.75	-0.56	0.49
							Avg.	-0.23	-0.75	-0.48	-0.22	-0.10	1.08	0.91	1.87
							Inches	-0.01	-0.03	-0.02	-0.01	0.00	0.04	0.04	0.07
			182	486+50	490+50	SB	Max.	1.52	0.00	1.17	-0.60	0.28	1.62	1.35	-0.12
							Min.	0.00	-1.35	-1.08	-3.51	-0.69	-1.62	-0.90	-2.33
							Avg.	0.56	-0.54	0.44	-1.55	-0.31	0.35	0.28	-1.66
							Inches	0.02	-0.02	0.02	-0.06	-0.01	0.01	0.01	-0.07
						NB/SB Combined (in.)		**0.01**	**-0.03**	**0.00**	**-0.03**	**-0.01**	**0.03**	**0.02**	**0.00**
C	9.0	Scarify	50	160+00	164+00	NB	Max.	1.57	0.09	-0.40	1.77	0.60	2.92	4.10	6.85
							Min.	-1.88	-0.45	-1.85	-0.48	-1.04	0.00	0.34	0.00
							Avg.	0.00	-0.21	-1.22	0.35	-0.31	0.84	2.60	2.08
							Inches	0.00	-0.01	-0.05	0.01	-0.01	0.03	0.10	0.08

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
						SB	Max.	1.46	0.00	1.32	0.00	0.26	1.17	1.88	-1.78
							Min.	-0.31	-0.91	-1.06	-2.74	-0.78	-0.58	-0.68	-5.33
							Avg.	0.76	-0.45	0.20	-1.63	-0.29	0.08	0.99	-3.68
							Inches	0.03	-0.02	0.01	-0.06	-0.01	0.00	0.04	-0.14
						NB/SB Combined (in.)		**0.02**	**-0.01**	**-0.02**	**-0.03**	**-0.01**	**0.02**	**0.07**	**-0.03**
			52	165+00	169+00	NB	Max.	1.30	1.49	0.13	2.90	1.12	4.28	5.98	5.83
							Min.	-4.41	-0.93	-2.25	-0.16	-1.04	-2.53	0.68	-0.51
							Avg.	-1.11	-0.09	-0.99	0.89	-0.20	0.88	2.99	3.02
							Inches	-0.04	0.00	-0.04	0.03	-0.01	0.03	0.12	0.12
						SB	Max.	4.41	0.00	2.25	0.00	0.78	2.92	2.22	1.27
							Min.	-4.41	-2.80	-1.72	-3.23	-0.69	0.19	-1.54	-4.82
							Avg.	0.75	-0.75	0.50	-1.74	-0.04	1.19	0.29	-2.28
							Inches	0.03	-0.03	0.02	-0.07	0.00	0.05	0.01	-0.09
						NB/SB Combined (in.)		**-0.01**	**-0.02**	**-0.01**	**-0.02**	**0.00**	**0.04**	**0.06**	**0.01**
			54	170+00	174+00	NB	Max.	1.15	0.57	-0.40	0.65	0.35	4.28	3.07	4.31
							Min.	-0.63	-1.14	-1.85	-0.97	-0.78	-0.78	0.68	0.51
							Avg.	0.29	-0.16	-1.14	-0.29	-0.51	0.86	1.86	2.54
							Inches	0.01	-0.01	-0.04	-0.01	-0.02	0.03	0.07	0.10
						SB	Max.	1.36	0.00	1.98	-0.81	0.69	2.33	1.20	0.00
							Min.	-0.94	-0.95	-0.26	-2.90	-0.69	-0.58	-2.56	-4.57
							Avg.	-0.04	-0.57	0.88	-1.76	-0.24	0.70	-0.12	-2.38
							Inches	0.00	-0.02	0.03	-0.07	-0.01	0.03	0.00	-0.09
						NB/SB Combined (in.)		**0.00**	**-0.01**	**0.00**	**-0.04**	**-0.01**	**0.03**	**0.03**	**0.00**
			56	175+00	179+00	NB	Max.	1.88	0.49	0.91	2.26	0.44	3.59	2.00	2.75
							Min.	-0.84	-0.99	-1.81	-0.48	-0.88	-2.08	-0.29	1.13
							Avg.	0.31	-0.33	-1.01	0.60	-0.37	0.49	1.00	1.85
							Inches	0.01	-0.01	-0.04	0.02	-0.01	0.02	0.04	0.07
						SB	Max.	1.04	0.00	1.17	-1.13	0.44	1.32	2.71	-1.46
							Min.	-0.52	-0.99	-0.26	-2.90	-0.61	-0.76	-0.57	-3.40
							Avg.	0.02	-0.39	0.39	-2.13	-0.26	0.25	0.70	-2.25
							Inches	0.00	-0.02	0.02	-0.08	-0.01	0.01	0.03	-0.09
						NB/SB Combined (in.)		**0.01**	**-0.01**	**-0.01**	**-0.03**	**-0.01**	**0.01**	**0.03**	**-0.01**
		HMA S.R.	120	335+00	339+00	NB	Max.	1.69	0.68	-0.09	0.93	0.49	1.78	2.23	1.78
							Min.	-1.45	-2.48	-1.17	-1.04	-0.70	0.00	0.00	0.00
							Avg.	0.49	-0.64	-0.66	-0.15	-0.10	0.59	1.21	1.17
							Inches	0.02	-0.03	-0.03	-0.01	0.00	0.02	0.05	0.05
						SB	Max.	0.97	0.23	0.99	-0.58	0.56	0.82	1.49	-0.89
							Min.	-1.81	-1.13	-0.18	-1.85	-0.56	-0.55	-0.45	-2.82
							Avg.	-0.12	-0.20	0.44	-1.17	-0.27	0.30	0.46	-2.24
							Inches	0.00	-0.01	0.02	-0.05	-0.01	0.01	0.02	-0.09
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.00**	**-0.03**	**-0.01**	**0.02**	**0.03**	**-0.02**
			122	340+00	344+00	NB	Max.	1.09	2.37	0.63	0.93	0.49	2.39	3.37	3.35
							Min.	-0.72	-2.02	-1.17	-1.05	-0.62	0.00	-0.67	-0.44
							Avg.	0.02	-0.46	-0.48	0.02	-0.11	1.18	1.14	1.30
							Inches	0.00	-0.02	-0.02	0.00	0.00	0.05	0.05	0.05
						SB	Max.	2.17	0.00	2.24	-0.70	0.21	1.91	2.02	-0.15
							Min.	-0.24	-1.19	-0.27	-2.22	-0.42	-0.95	-0.67	-2.77
							Avg.	0.56	-0.24	0.48	-1.59	-0.10	0.11	0.71	-1.79
							Inches	0.02	-0.01	0.02	-0.06	0.00	0.00	0.03	-0.07
						NB/SB Combined (in.)		**0.01**	**-0.01**	**0.00**	**-0.03**	**0.00**	**0.03**	**0.04**	**-0.01**
			124	345+00	349+00	NB	Max.	1.21	0.56	0.54	1.17	0.83	3.98	4.04	4.07
							Min.	-1.45	-1.11	-1.17	-0.93	-0.62	-0.48	-0.67	0.00
							Avg.	0.22	-0.50	-0.31	0.19	0.01	0.81	0.89	1.54
							Inches	0.01	-0.02	-0.01	0.01	0.00	0.03	0.03	0.06
						SB	Max.	2.66	0.00	1.26	-0.70	0.21	2.23	2.69	-1.02
							Min.	-1.57	-1.11	-0.09	-2.10	-0.55	-0.48	-0.54	-2.77

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
							Avg.	0.30	-0.44	0.30	-1.62	-0.10	0.35	0.55	-2.20
							Inches	0.01	-0.02	0.01	-0.06	0.00	0.01	0.02	-0.09
						NB/SB Combined (in.)		**0.01**	**-0.02**	**0.00**	**-0.03**	**0.00**	**0.02**	**0.03**	**-0.01**
						NB	Max.	1.45	1.06	0.27	0.93	0.83	3.34	3.23	4.07
							Min.	-1.69	-2.23	-1.08	-0.93	-0.76	0.00	-0.13	0.00
							Avg.	0.05	-0.86	-0.43	-0.36	-0.17	1.08	1.40	1.99
							Inches	0.00	-0.03	-0.02	-0.01	-0.01	0.04	0.06	0.08
			126	350+00	354+00	SB	Max.	1.45	0.00	1.53	0.00	0.62	1.59	2.69	0.00
							Min.	-0.97	-1.06	-0.09	-2.10	-0.55	-1.59	0.13	-3.06
							Avg.	-0.02	-0.11	0.43	-1.17	-0.03	0.16	1.00	-1.76
							Inches	0.00	0.00	0.02	-0.05	0.00	0.01	0.04	-0.07
						NB/SB Combined (in.)		**0.00**	**-0.02**	**0.00**	**-0.03**	**0.00**	**0.02**	**0.05**	**0.00**
		Patch				NB	Max.	2.28	0.92	0.51	1.26	0.69	2.56	2.60	3.44
							Min.	-1.22	-2.25	-1.77	-2.14	-0.69	-0.27	-0.56	-0.86
							Avg.	0.62	-0.32	-0.69	-0.15	-0.10	0.79	1.16	1.56
							Inches	0.02	-0.01	-0.03	-0.01	0.00	0.03	0.05	0.06
			184	491+00	495+00	SB	Max.	2.13	0.00	0.93	-0.25	0.76	2.56	1.47	2.09
							Min.	-1.37	-2.64	-0.17	-2.14	-0.55	-0.40	0.00	-2.33
							Avg.	0.99	-0.79	0.41	-1.35	-0.15	0.36	0.52	-1.01
							Inches	0.04	-0.03	0.02	-0.05	-0.01	0.01	0.02	-0.04
						NB/SB Combined (in.)		**0.03**	**-0.02**	**-0.01**	**-0.03**	**0.00**	**0.02**	**0.03**	**0.01**
						NB	Max.	1.52	1.43	0.41	1.26	0.83	1.98	1.81	2.46
							Min.	-1.83	-1.86	-0.81	-1.13	-0.83	0.13	-1.69	-0.61
							Avg.	-0.37	-0.66	-0.37	-0.09	-0.08	1.04	0.14	1.41
							Inches	-0.01	-0.03	-0.01	0.00	0.00	0.04	0.01	0.06
			186	495+50	499+50	SB	Max.	1.98	0.00	1.38	-0.63	0.55	1.58	0.68	-0.37
							Min.	-1.37	-1.43	-0.16	-2.39	-0.55	-0.53	-0.45	-2.33
							Avg.	0.52	-0.14	0.51	-1.59	0.03	0.30	0.18	-1.54
							Inches	0.02	-0.01	0.02	-0.06	0.00	0.01	0.01	-0.06
						NB/SB Combined (in.)		**0.00**	**-0.02**	**0.00**	**-0.03**	**0.00**	**0.03**	**0.01**	**0.00**
No	4.5					NB	Max.	1.25	0.00	-0.23	2.62	0.61	2.84	2.86	3.08
							Min.	-0.52	-1.25	-1.47	-0.16	-0.88	-0.57	-0.43	-0.32
							Avg.	0.34	-0.56	-0.84	1.23	-0.48	0.38	1.30	1.36
							Inches	0.01	-0.02	-0.03	0.05	-0.02	0.01	0.05	0.05
			61	189+00	193+00	SB	Max.	0.21	0.96	1.02	-0.82	0.18	1.89	0.29	-0.16
							Min.	-1.15	-0.96	-0.23	-2.94	-0.70	-0.95	-1.14	-3.08
							Avg.	-0.39	0.00	0.27	-2.13	-0.39	0.28	-0.31	-1.83
							Inches	-0.02	0.00	0.01	-0.08	-0.02	0.01	-0.01	-0.07
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.01**	**-0.02**	**-0.02**	**0.01**	**0.02**	**-0.01**
		Scarify				NB	Max.	1.36	0.37	0.11	0.33	0.44	1.70	2.86	1.62
							Min.	-1.99	-1.38	-1.58	-1.64	-2.10	-0.38	0.00	-1.13
							Avg.	-0.20	-0.50	-1.06	-0.96	-0.43	0.49	1.11	0.75
							Inches	-0.01	-0.02	-0.04	-0.04	-0.02	0.02	0.04	0.03
			63	194+00	198+00	SB	Max.	1.04	0.00	0.56	-0.98	0.61	3.22	3.00	0.16
							Min.	-1.15	0.00	-1.47	-3.27	-1.23	-0.57	-1.14	-3.08
							Avg.	-0.05	0.00	-0.05	-2.14	-0.50	0.76	1.50	-1.57
							Inches	0.00	0.00	0.00	-0.08	-0.02	0.03	0.06	-0.06
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.02**	**-0.06**	**-0.02**	**0.02**	**0.05**	**-0.02**
		HMA S.R.	128	355+00	359+00	NB	Max.	3.63	0.57	-0.18	0.93	0.49	2.39	3.10	3.64
							Min.	-1.04	-1.72	-1.26	-2.10	-0.62	-0.64	-0.54	0.87
							Avg.	0.78	-0.59	-0.69	-0.46	0.10	0.94	1.08	1.89
							Inches	0.03	-0.02	-0.03	-0.02	0.00	0.04	0.04	0.07
						SB	Max.	2.33	1.15	0.99	0.00	0.00	1.91	1.62	-0.58
							Min.	-2.59	-1.15	-0.09	-2.22	-0.55	-0.48	-1.48	-2.77
							Avg.	-0.03	-0.11	0.37	-1.68	-0.37	0.62	0.28	-1.79
							Inches	0.00	0.00	0.01	-0.07	-0.01	0.02	0.01	-0.07

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
						NB/SB Combined (in.)		**0.01**	**-0.01**	**-0.01**	**-0.04**	**-0.01**	**0.03**	**0.03**	**0.00**
			130	360+00	364+00	NB	Max.	2.96	1.63	0.63	1.17	0.49	2.86	3.16	4.07
							Min.	-3.23	-0.93	-1.08	-1.05	-0.57	0.00	-0.69	0.00
							Avg.	-0.03	-0.05	-0.17	0.05	0.00	0.73	1.08	1.40
							Inches	0.00	0.00	-0.01	0.00	0.00	0.03	0.04	0.06
						SB	Max.	4.04	0.00	1.35	0.58	0.78	1.71	1.10	0.87
							Min.	-4.04	0.00	-0.99	-2.33	-0.99	-1.14	-1.78	-3.06
							Avg.	-0.30	0.00	0.37	-1.11	-0.08	0.64	-0.10	-1.62
							Inches	-0.01	0.00	0.01	-0.04	0.00	0.03	0.00	-0.06
						NB/SB Combined (in.)		**-0.01**	**0.00**	**0.00**	**-0.02**	**0.00**	**0.03**	**0.02**	**0.00**
		Patch	189	500+50	506+60	NB	Max.	1.79	0.70	0.57	1.26	0.49	2.25	2.71	3.68
							Min.	-2.38	-3.08	-0.98	-2.27	-0.69	-0.79	-0.90	-0.86
							Avg.	-0.06	-0.80	-0.50	-0.42	-0.05	0.41	0.51	1.19
							Inches	0.00	-0.03	-0.02	-0.02	0.00	0.02	0.02	0.05
						SB	Max.	1.79	0.00	1.14	-0.63	0.69	0.79	1.81	-0.25
							Min.	-2.23	-1.40	-0.16	-2.14	-0.62	-0.79	-1.69	-2.58
							Avg.	-0.04	-0.28	0.34	-1.55	-0.20	0.13	0.35	-1.60
							Inches	0.00	-0.01	0.01	-0.06	-0.01	0.01	0.01	-0.06
						NB/SB Combined (in.)		**0.00**	**-0.02**	**0.00**	**-0.04**	**0.00**	**0.01**	**0.02**	**-0.01**
	6.0	Scarify	65	199+00	203+00	NB	Max.	1.67	0.57	-0.34	0.49	0.35	1.46	4.27	5.30
							Min.	-1.25	-1.23	-1.58	-1.47	-0.86	-0.44	0.51	0.00
							Avg.	0.21	-0.24	-1.14	-0.21	-0.43	0.74	2.00	2.20
							Inches	0.01	-0.01	-0.04	-0.01	-0.02	0.03	0.08	0.09
						SB	Max.	1.04	0.00	1.58	-0.82	0.69	2.33	1.02	-0.27
							Min.	-3.13	-0.95	-0.11	-2.94	-0.78	-0.73	-1.02	-4.51
							Avg.	-0.14	-0.38	0.52	-1.77	-0.34	-0.04	-0.05	-1.91
							Inches	-0.01	-0.01	0.02	-0.07	-0.01	0.00	0.00	-0.08
						NB/SB Combined (in.)		**0.00**	**-0.01**	**-0.01**	**-0.04**	**-0.02**	**0.01**	**0.04**	**0.01**
			67	204+00	208+00	NB	Max.	1.13	0.00	-0.23	-0.33	0.17	1.90	4.61	5.83
							Min.	-0.79	-2.05	-1.58	-1.64	-1.12	-0.15	-0.34	1.33
							Avg.	0.43	-0.75	-1.17	-1.18	-0.49	0.83	2.32	3.05
							Inches	0.02	-0.03	-0.05	-0.05	-0.02	0.03	0.09	0.12
						SB	Max.	1.13	0.00	1.35	0.82	0.86	1.90	0.00	-0.80
							Min.	-1.24	-0.93	-0.23	-2.62	-0.69	-0.58	-4.27	-2.92
							Avg.	0.09	-0.09	0.28	-1.10	-0.35	0.55	-1.95	-1.80
							Inches	0.00	0.00	0.01	-0.04	-0.01	0.02	-0.08	-0.07
						NB/SB Combined (in.)		**0.01**	**-0.02**	**-0.02**	**-0.04**	**-0.02**	**0.03**	**0.01**	**0.02**
		HMA S.R.	132	365+00	369+00	NB	Max.	2.17	1.15	0.36	0.96	0.21	2.86	2.20	3.35
							Min.	-1.69	-1.49	-1.17	-1.08	-0.78	-0.57	-0.69	0.87
							Avg.	0.22	-0.34	-0.67	-0.30	-0.39	0.57	0.77	1.82
							Inches	0.01	-0.01	-0.03	-0.01	-0.02	0.02	0.03	0.07
						SB	Max.	2.90	0.00	1.35	-0.72	0.71	1.86	2.33	0.15
							Min.	-2.90	-1.15	0.09	-2.04	-0.71	-0.57	-0.27	-2.77
							Avg.	0.05	-0.11	0.48	-1.38	-0.26	0.40	0.49	-1.31
							Inches	0.00	0.00	0.02	-0.05	-0.01	0.02	0.02	-0.05
						NB/SB Combined (in.)		**0.01**	**-0.01**	**0.00**	**-0.03**	**-0.01**	**0.02**	**0.02**	**0.01**
			134	370+00	374+00	NB	Max.	3.11	0.59	0.17	1.44	0.85	3.00	3.29	2.19
							Min.	-2.53	-1.19	-1.04	-0.96	-0.71	-0.14	-0.69	-3.94
							Avg.	0.64	-0.40	-0.75	0.08	-0.11	0.80	0.67	0.15
							Inches	0.03	-0.02	-0.03	0.00	0.00	0.03	0.03	0.01
						SB	Max.	1.94	0.00	1.64	-0.48	0.71	2.43	0.96	1.53
							Min.	-1.94	0.00	-0.09	-2.16	-0.57	-0.14	-1.10	-3.94
							Avg.	-0.02	0.00	0.67	-1.26	0.06	0.96	0.00	-0.70
							Inches	0.00	0.00	0.03	-0.05	0.00	0.04	0.00	-0.03
						NB/SB Combined (in.)		**0.01**	**-0.01**	**0.00**	**-0.02**	**0.00**	**0.03**	**0.01**	**-0.01**

Fiber Type	Panel Size	Surface Prep.	Section	Station		Lane		Faulting Values, mm							
				Begin	End			Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
		Patch	191	507+60	513+70	NB	Max.	2.63	0.00	0.49	1.38	0.49	2.51	1.58	3.44
							Min.	-3.15	-1.30	-1.14	-2.39	-0.69	-0.40	-0.11	-0.98
							Avg.	0.11	-0.62	-0.50	0.19	-0.40	0.98	0.61	1.26
							Inches	0.00	-0.02	-0.02	0.01	-0.02	0.04	0.02	0.05
						SB	Max.	0.88	0.00	0.98	-0.76	0.62	0.79	0.79	0.00
							Min.	-1.93	-1.30	-1.06	-2.52	-0.62	-1.06	-0.68	-2.21
							Avg.	-0.26	-0.52	0.17	-1.75	-0.28	0.05	0.08	-1.23
							Inches	-0.01	-0.02	0.01	-0.07	-0.01	0.00	0.00	-0.05
						NB/SB Combined (in.)		**0.00**	**-0.02**	**-0.01**	**-0.03**	**-0.01**	**0.02**	**0.01**	**0.00**
		Remove	59	183+75	186+75	NB	Max.	1.15	0.20	-0.45	1.96	0.53	3.41	3.29	4.38
							Min.	-1.99	-1.50	-1.58	-0.49	-0.88	0.00	0.57	-1.13
							Avg.	0.08	-0.57	-1.04	0.34	-0.31	1.49	1.57	1.57
							Inches	0.00	-0.02	-0.04	0.01	-0.01	0.06	0.06	0.06
						SB	Max.	1.57	0.00	1.92	0.49	0.88	2.65	1.57	0.97
							Min.	-1.46	-1.00	0.11	-2.13	-0.79	-0.57	-2.14	-3.08
							Avg.	0.02	-0.70	0.96	-1.00	0.17	0.38	0.51	-0.94
							Inches	0.00	-0.03	0.04	-0.04	0.01	0.01	0.02	-0.04
						NB/SB Combined (in.)		**0.00**	**-0.03**	**0.00**	**-0.01**	**0.00**	**0.04**	**0.04**	**0.01**

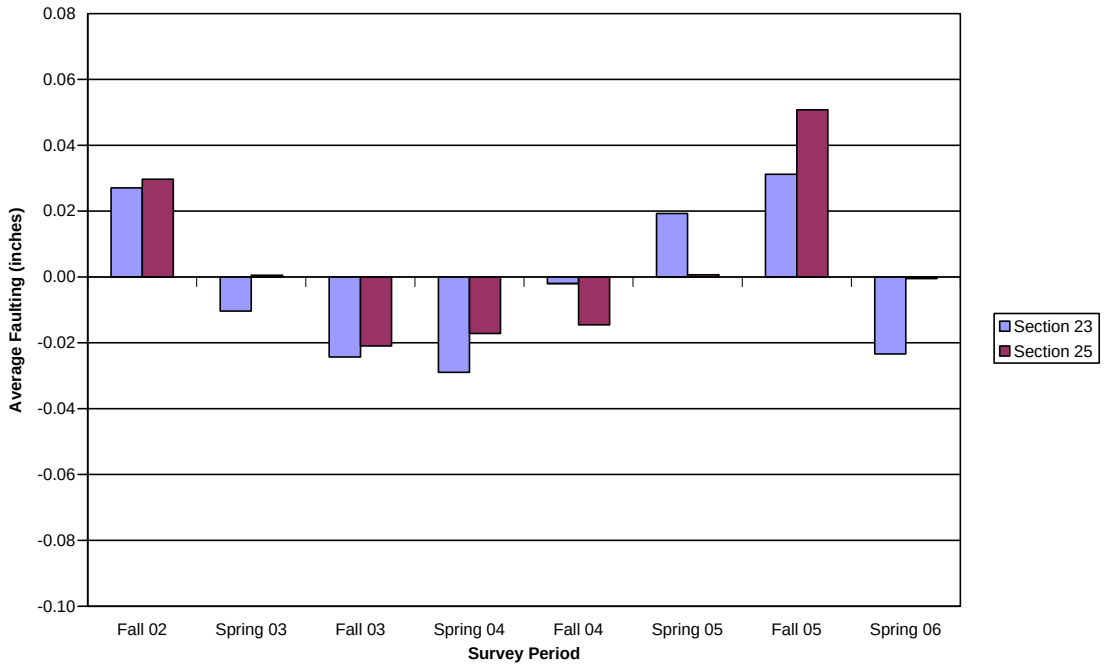

Figure B.1. Faulting, 3.5” depth, scarify, no fibers, 4.5’ panel

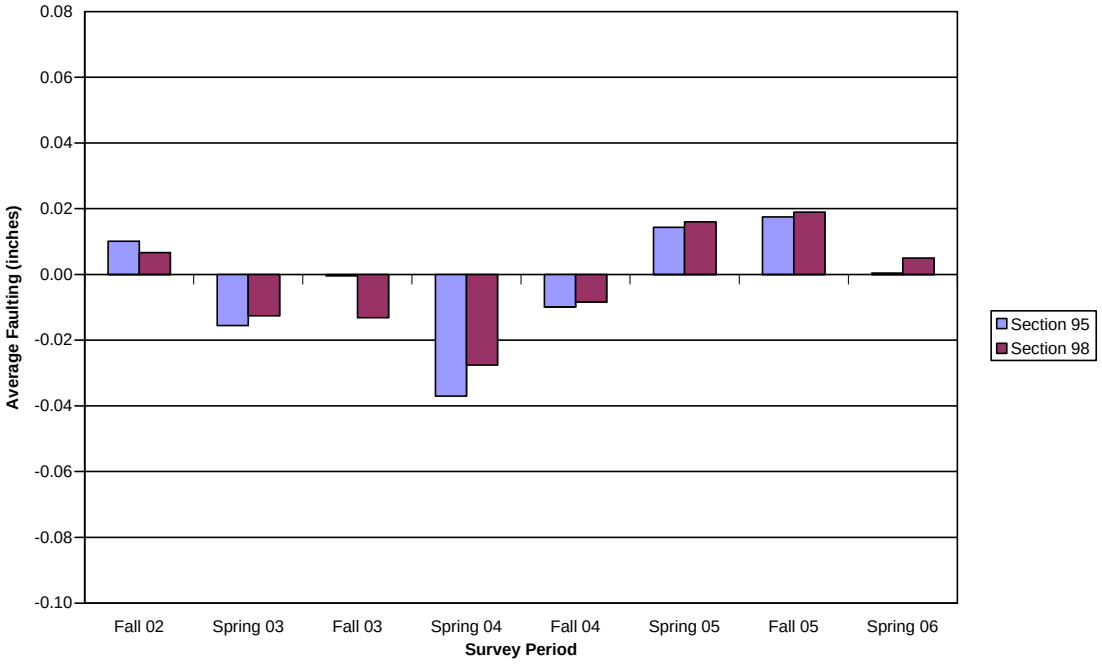

Figure B.2. Faulting, 3.5” depth, HMA S.R., no fibers, 4.5’ panel

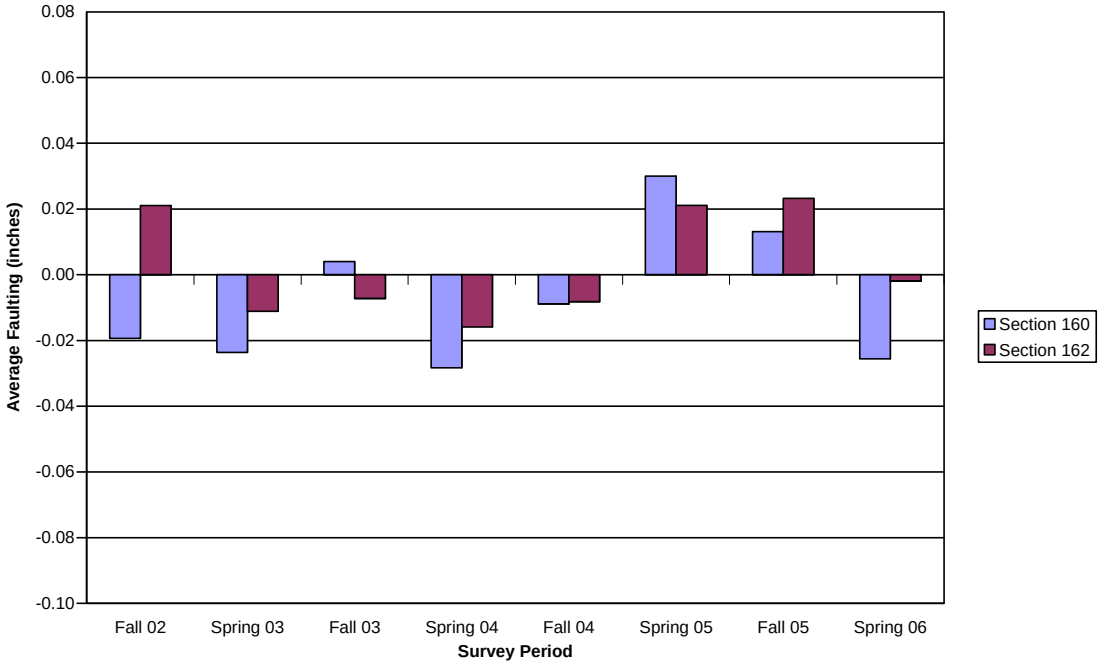

Figure B.3. Faulting, 3.5” depth, patch, no fibers, 4.5’ panel

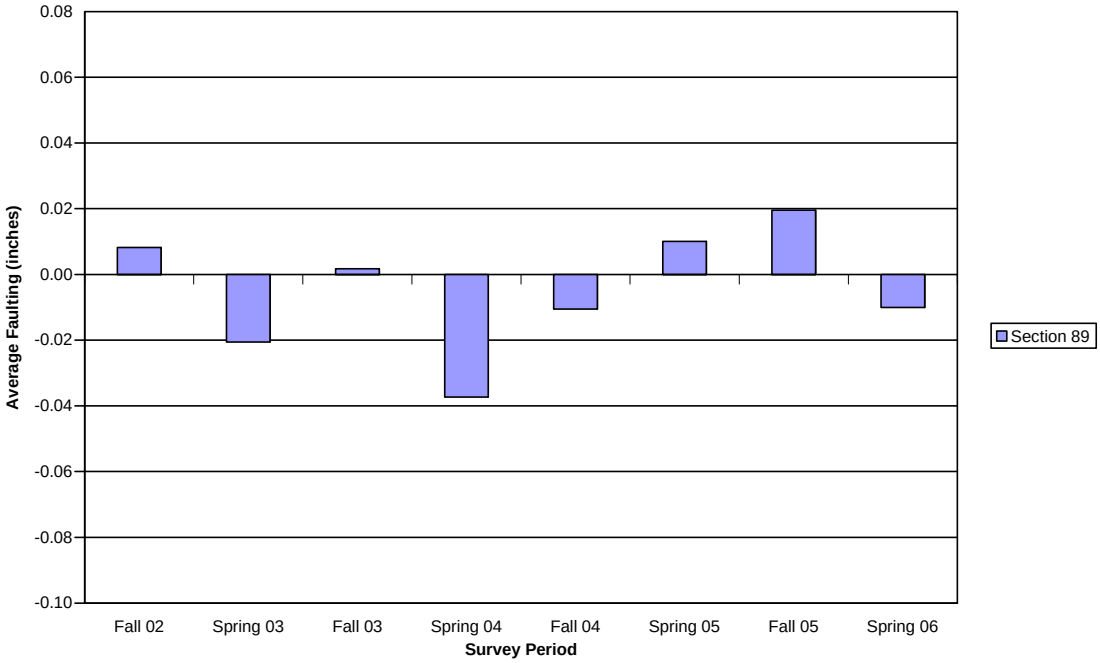

Figure B.4. Faulting, 3.5” depth, remove, no fibers, 4.5’ panel

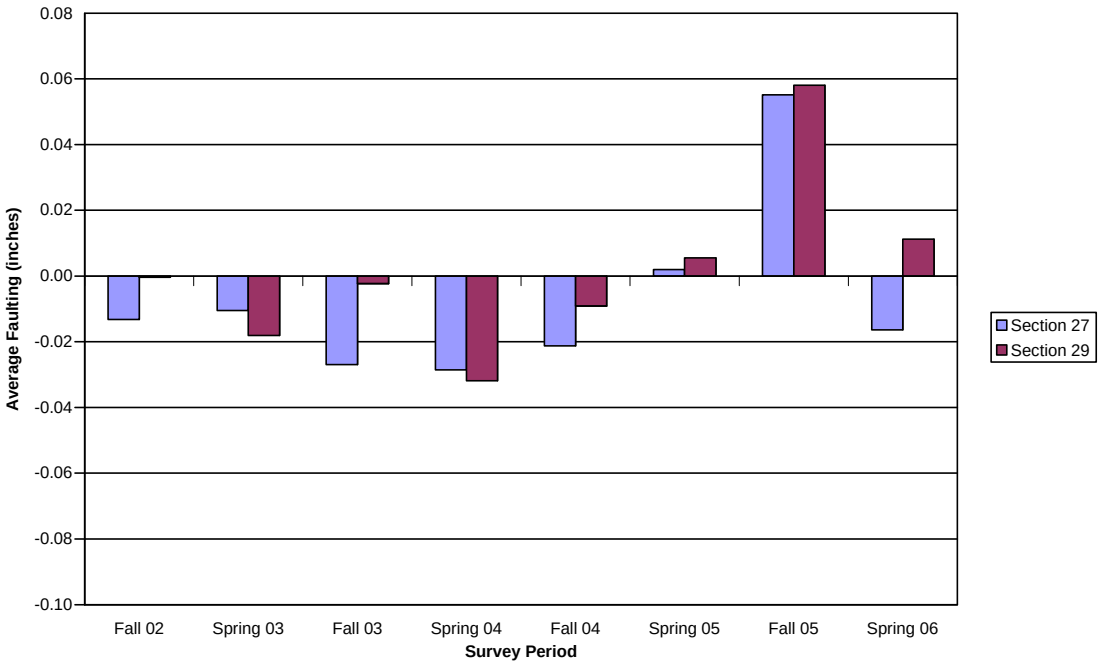

Figure B.5. Faulting, 3.5” depth, scarify, no fibers, 6’ panel

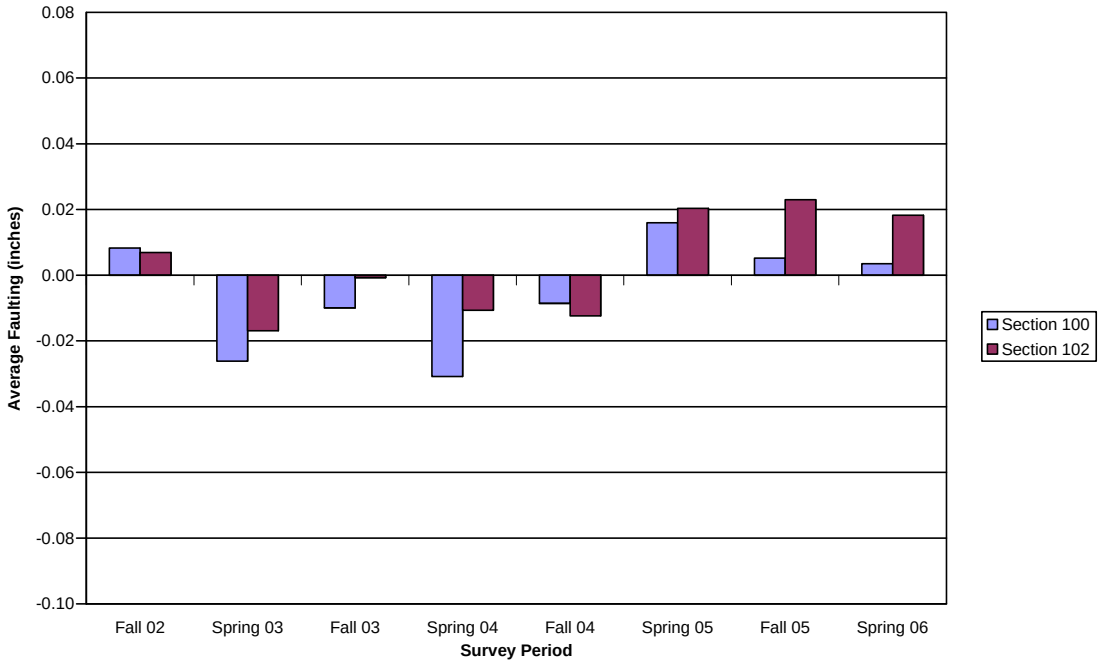

Figure B.6. Faulting, 3.5” depth, HMA S.R., no fibers, 6’ panel

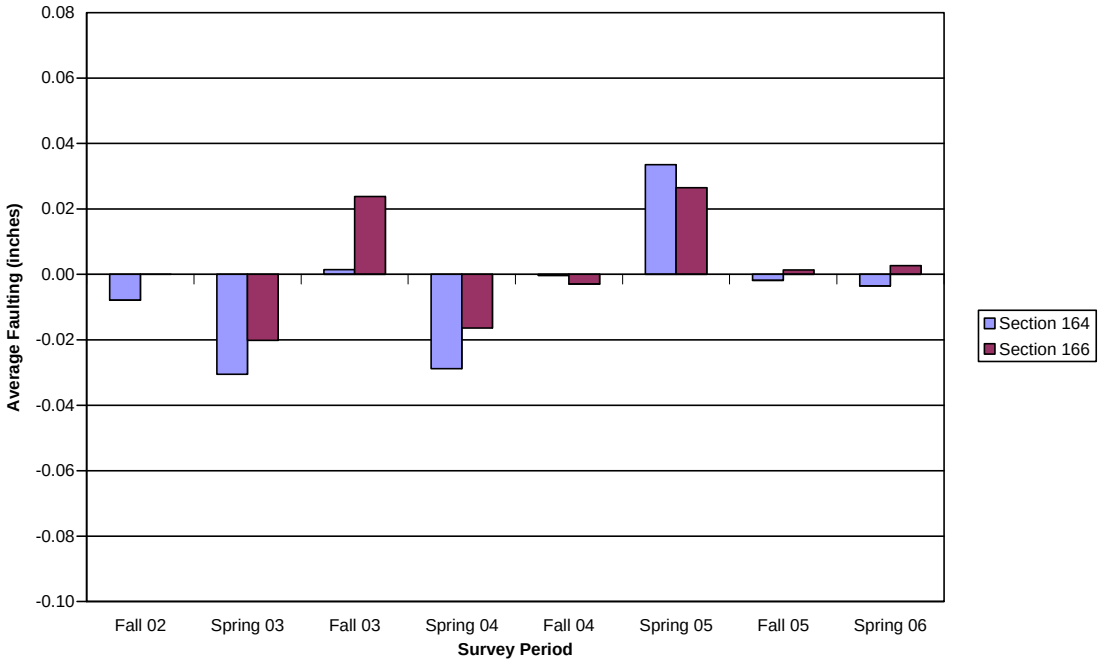

Figure B.7. Faulting, 3.5” depth, patch, no fibers, 6’ panel

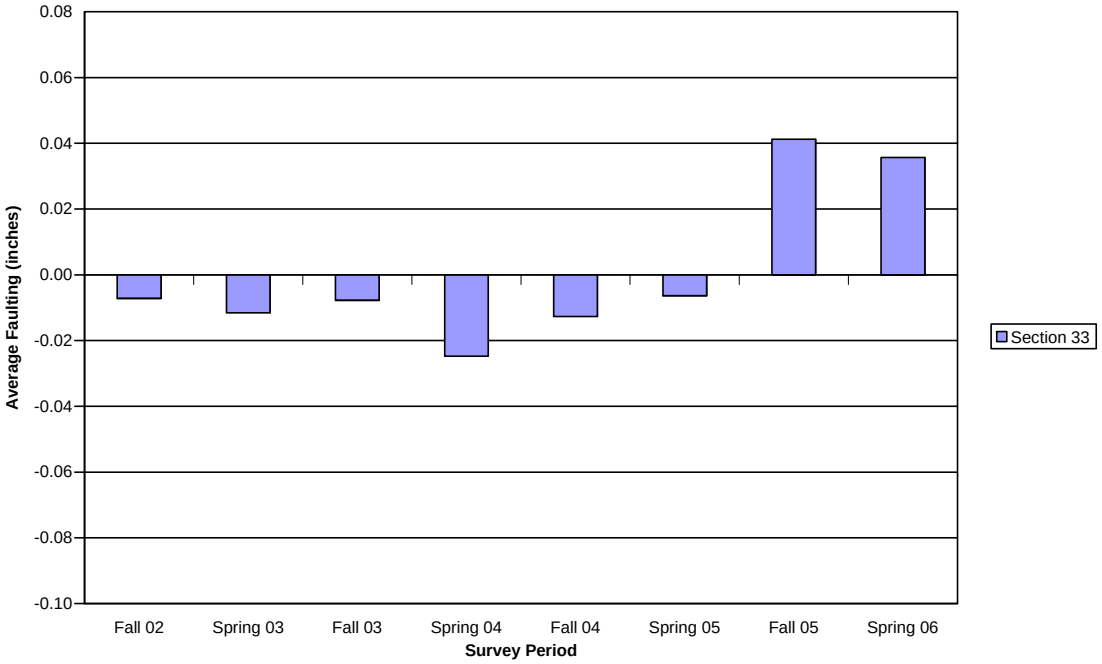

Figure B.8. Faulting, 3.5” depth, scarify, fiber A, 4.5’ panel

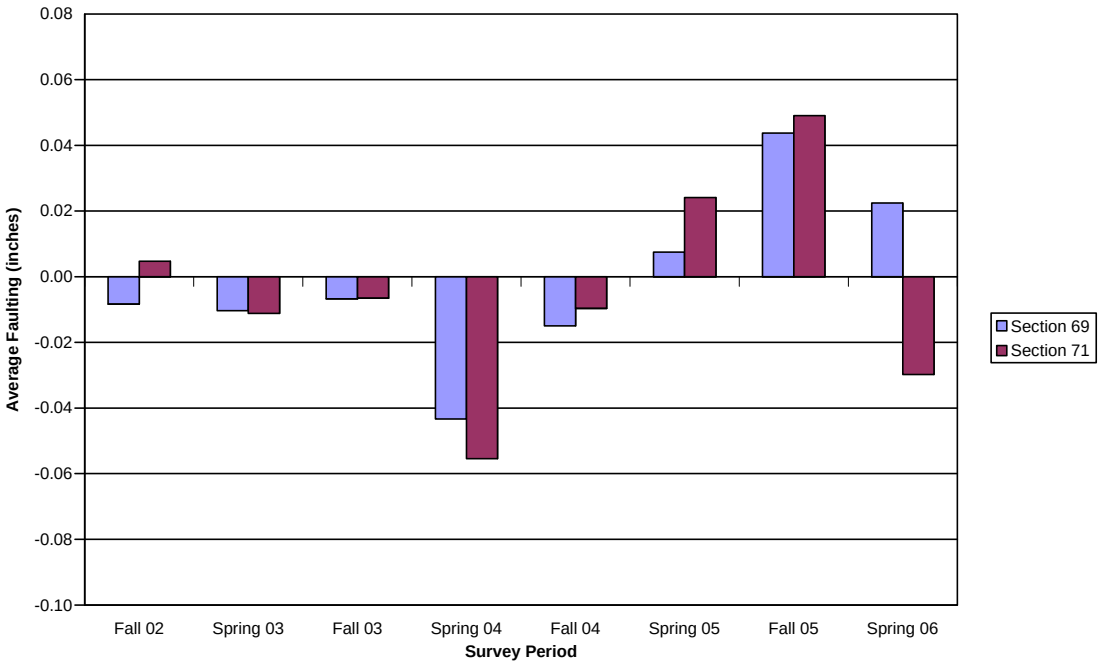

Figure B.9. Faulting, 3.5” depth, HMA S.R., fiber A, 4.5’ panel

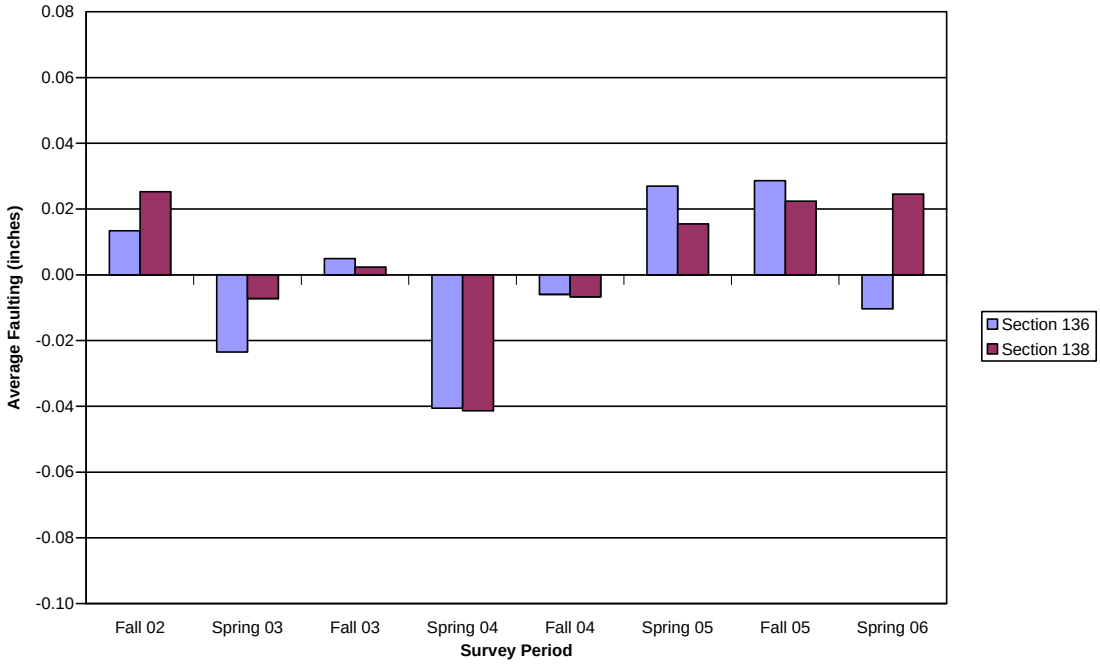

Figure B.10. Faulting, 3.5” depth, patch, fiber A, 4.5’ panel

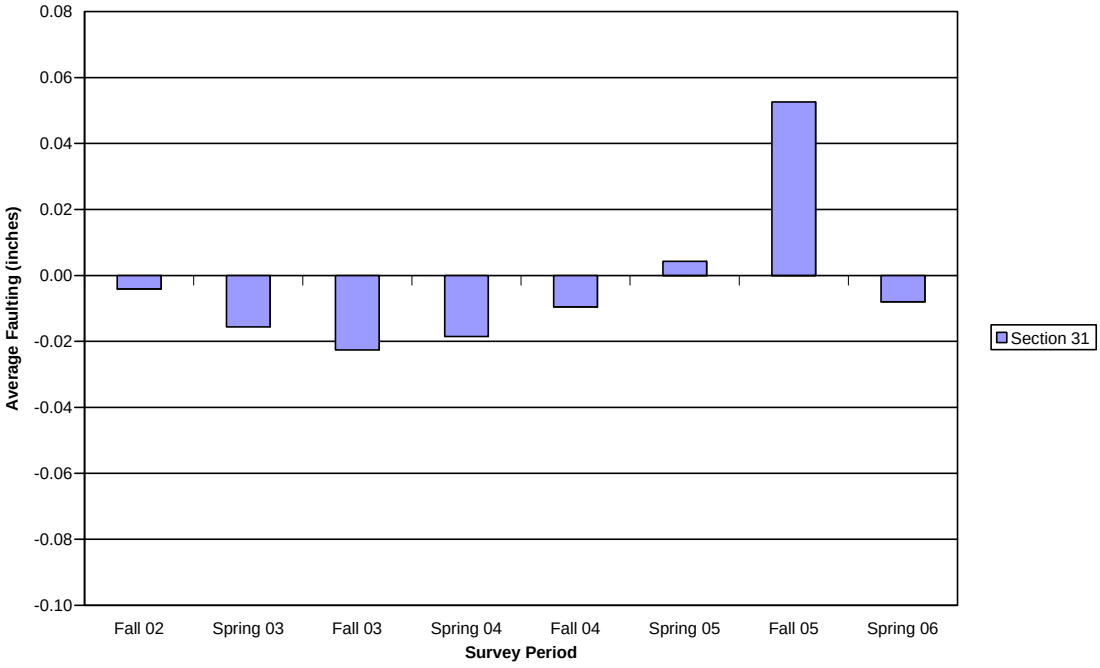

Figure B.11. Faulting, 3.5” depth, scarify, fiber A, 6’ panel

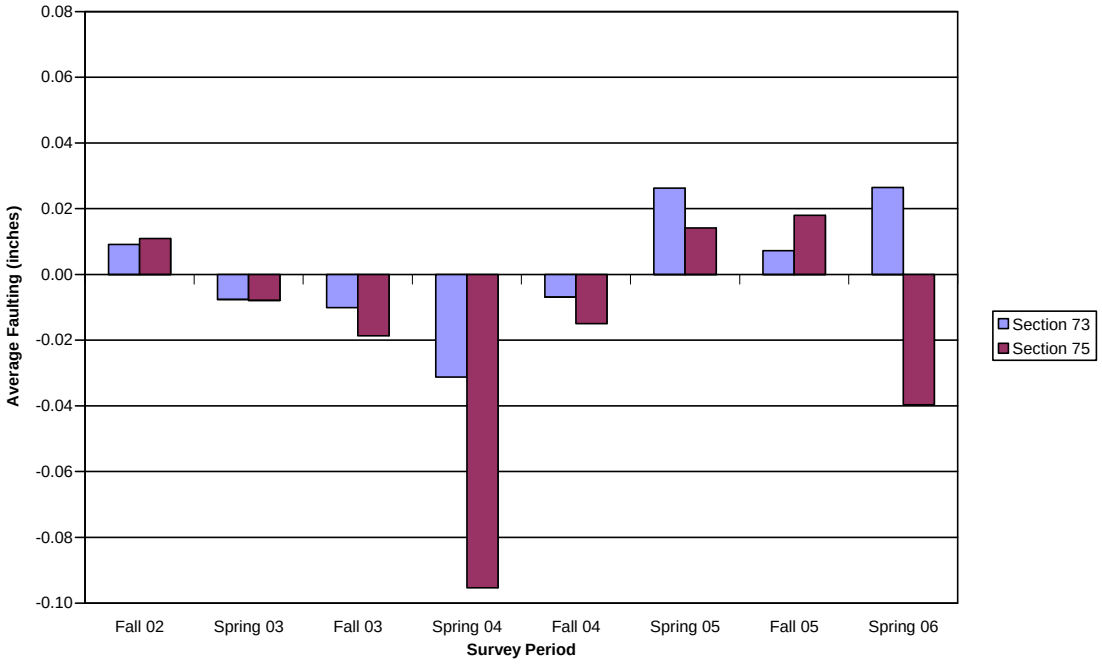

Figure B.12. Faulting, 3.5” depth, HMA S.R., fiber A, 6’ panel

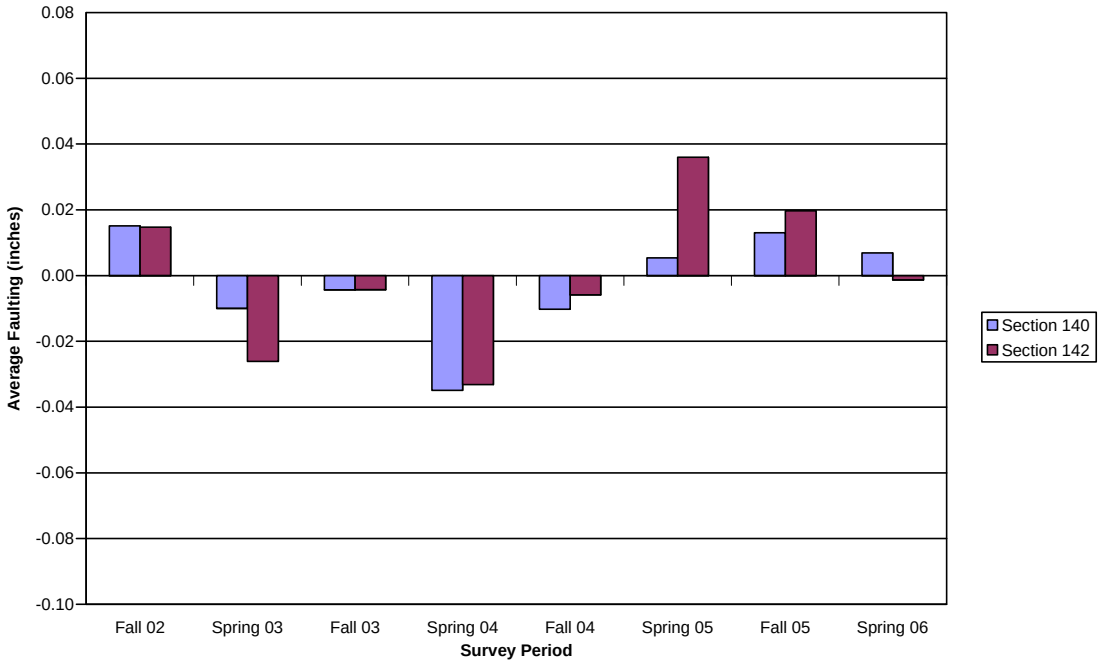

Figure B.13. Faulting, 3.5” depth, patch, fiber A, 6’ panel

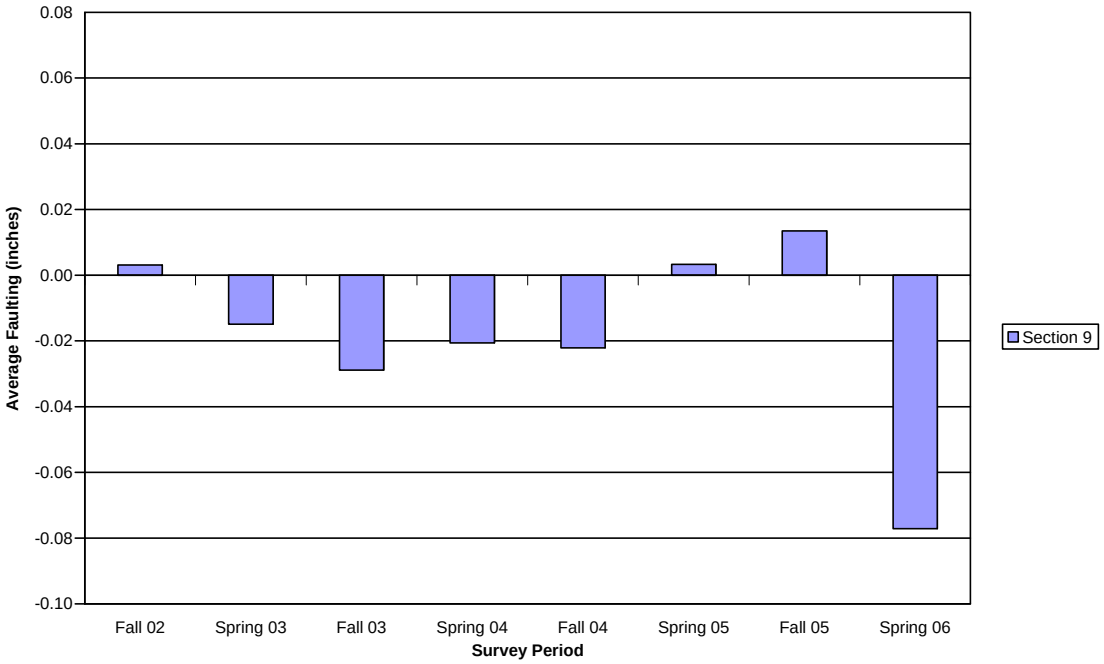

Figure B.14. Faulting, 3.5” depth, scarify, fiber B, 4.5’ panel

Figure B.15. Faulting, 3.5” depth, HMA S.R., fiber B, 4.5’ panel

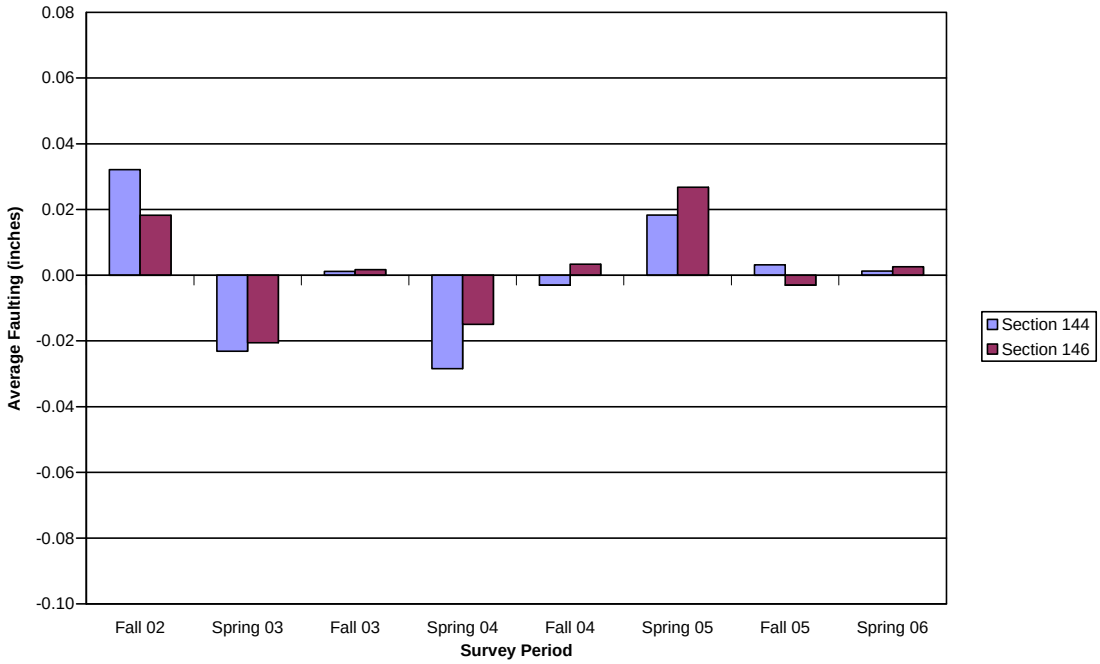

Figure B.16. Faulting, 3.5” depth, patch, fiber B, 4.5’ panel

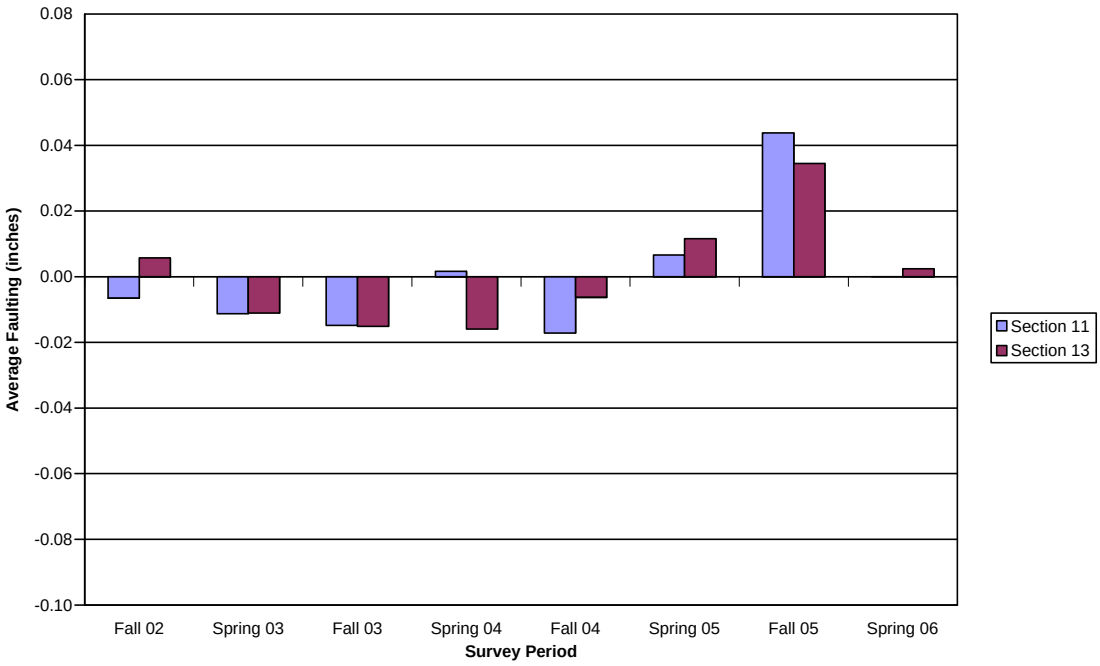

Figure B.17. Faulting, 3.5” depth, scarify, fiber B, 6’ panel

Figure B.18. Faulting, 3.5” depth, HMA S.R., fiber B, 6’ panel

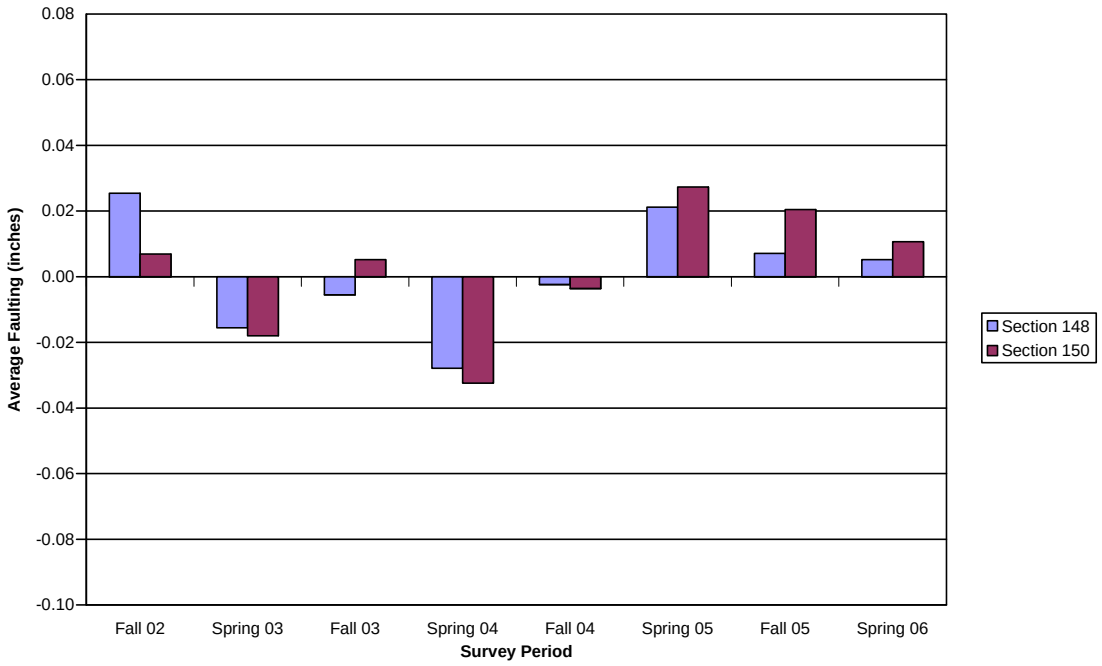

Figure B.19. Faulting, 3.5” depth, patch, fiber B, 6’ panel

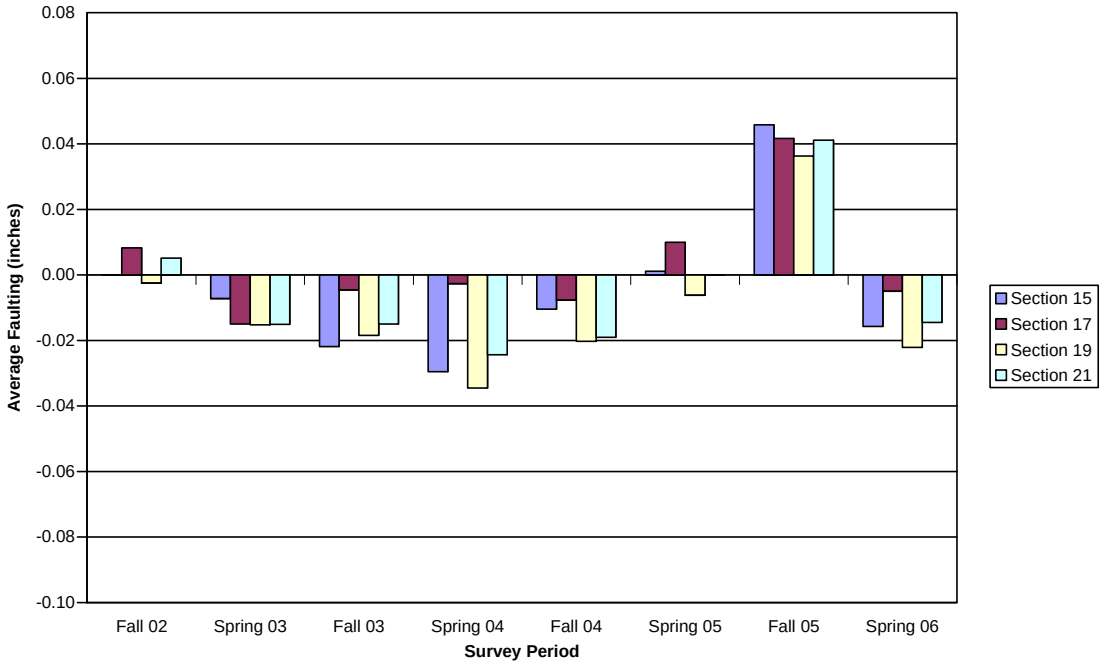

Figure B.20. Faulting, 3.5” depth, scarify, fiber C, 6’ panel

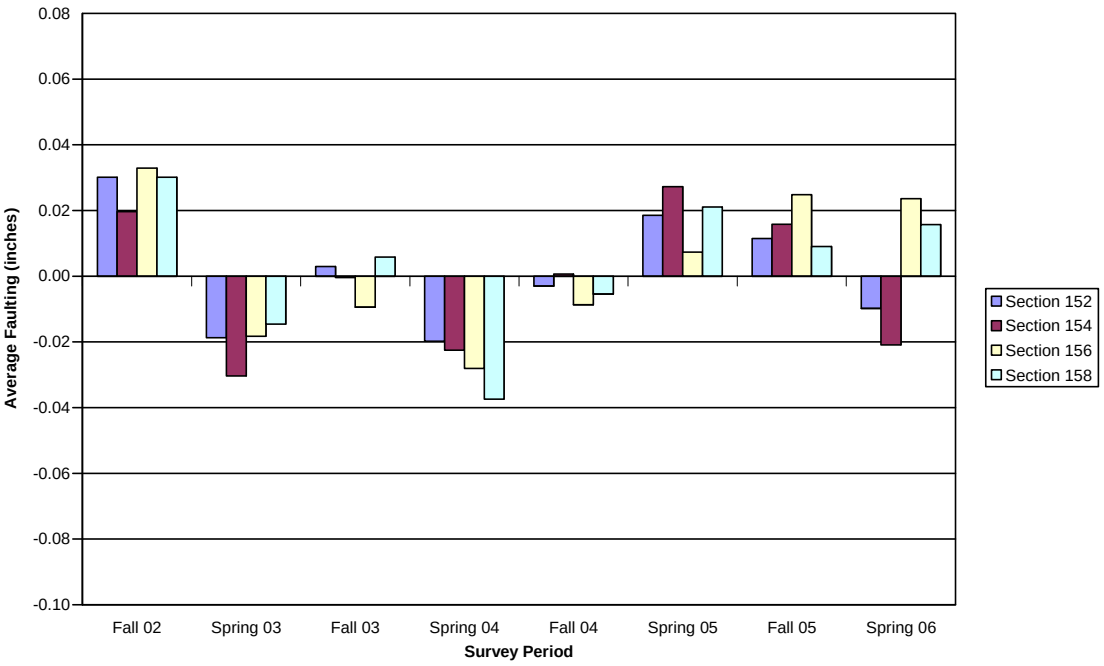

Figure B.21. Faulting, 3.5” depth, patch, fiber C, 6’ panel

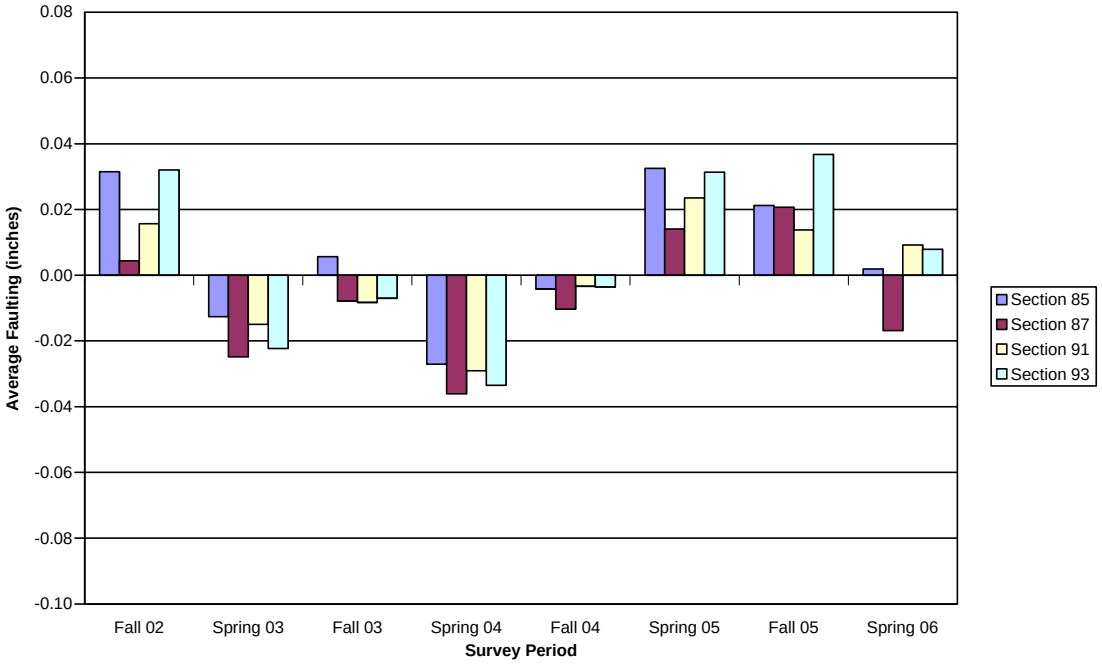

Figure B.22. Faulting, 3.5” depth, HMA S.R., fiber C, 9’ panel

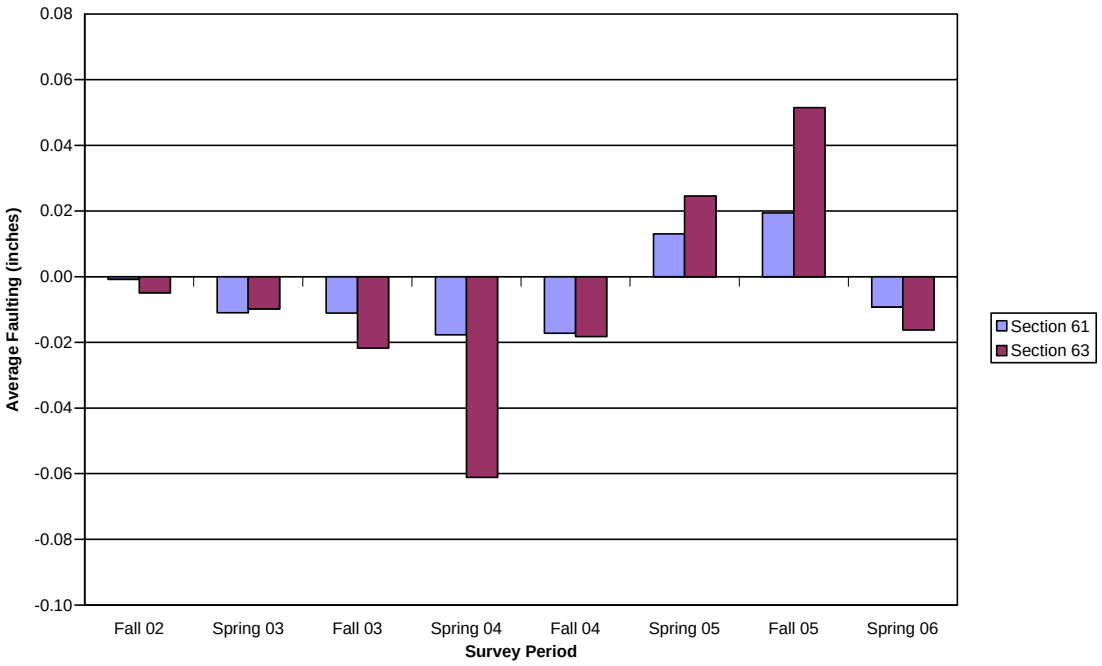

Figure B.23. Faulting, 4.5” depth, scarify, no fibers, 4.5’ panel

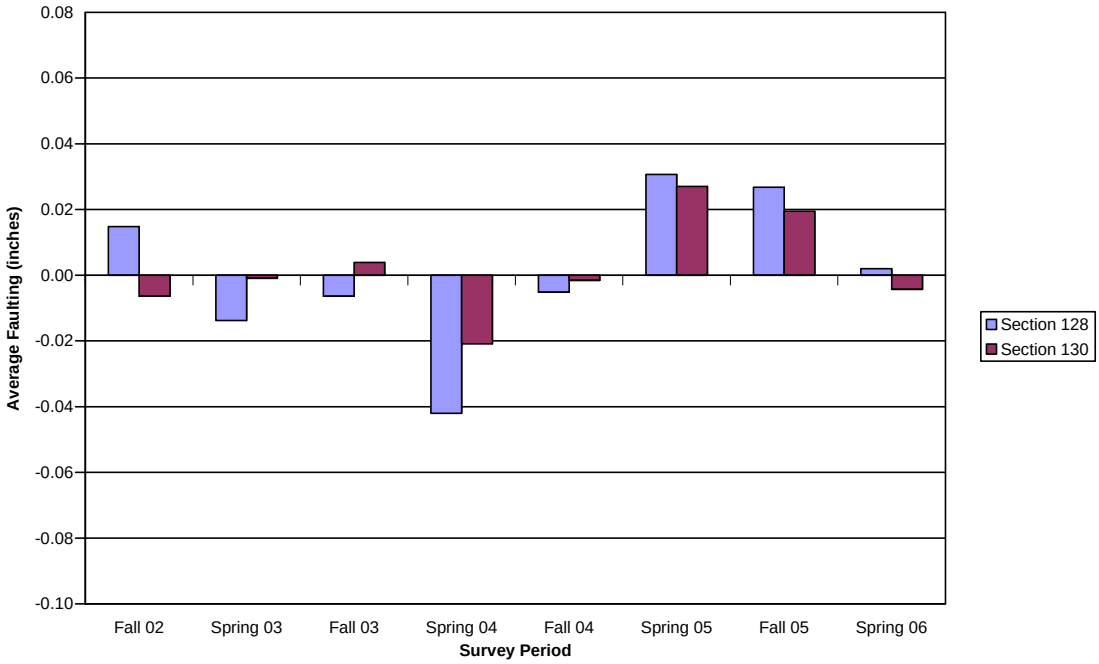

Figure B.24. Faulting, 4.5” depth, HMA S.R., no fibers, 4.5’ panel

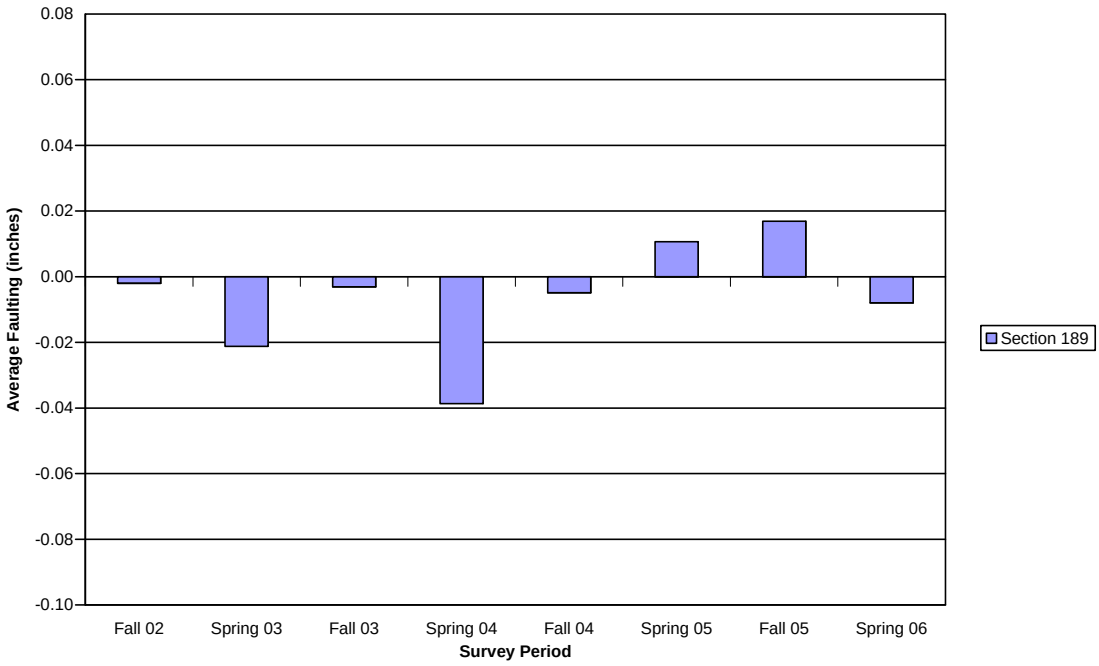

Figure B.25. Faulting, 4.5” depth, patch, no fibers, 4.5’ panel

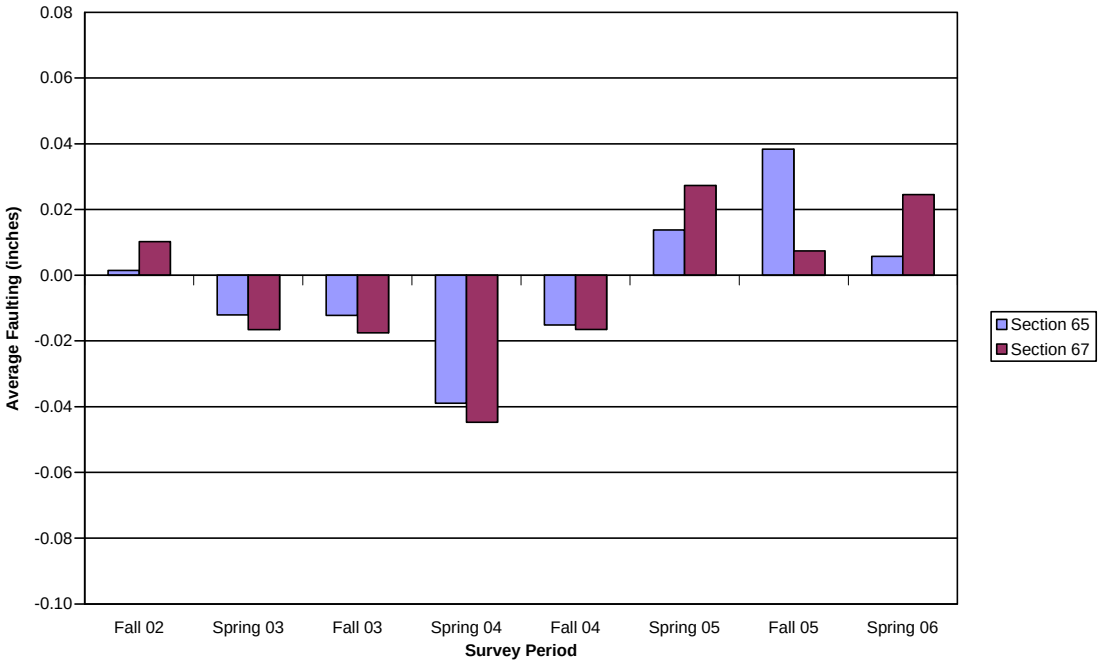

Figure B.26. Faulting, 4.5” depth, scarify, no fibers, 6’ panel

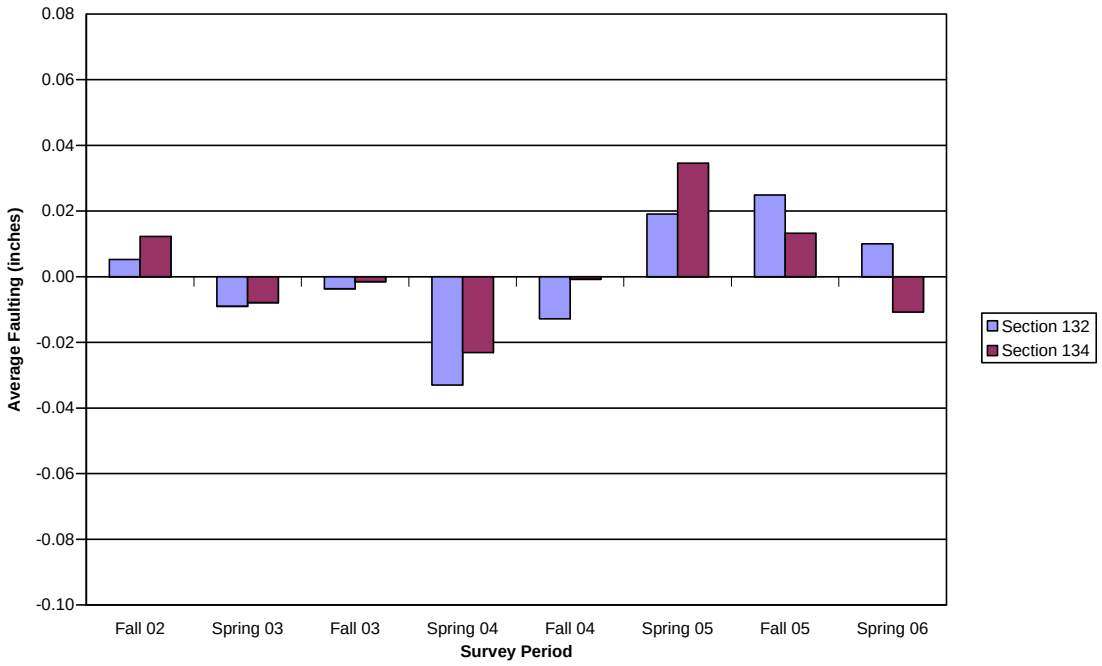

Figure B.27. Faulting, 4.5” depth, HMA S.R., no fibers, 6’ panel

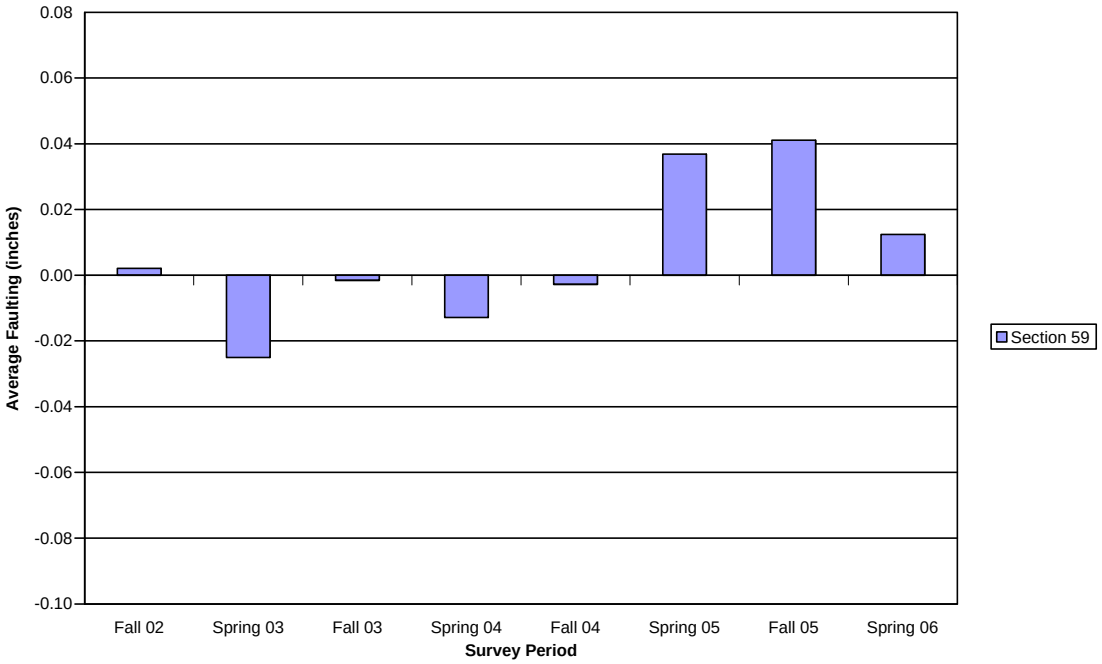

Figure B.28. Faulting, 4.5” depth, patch, no fibers, 6’ panel

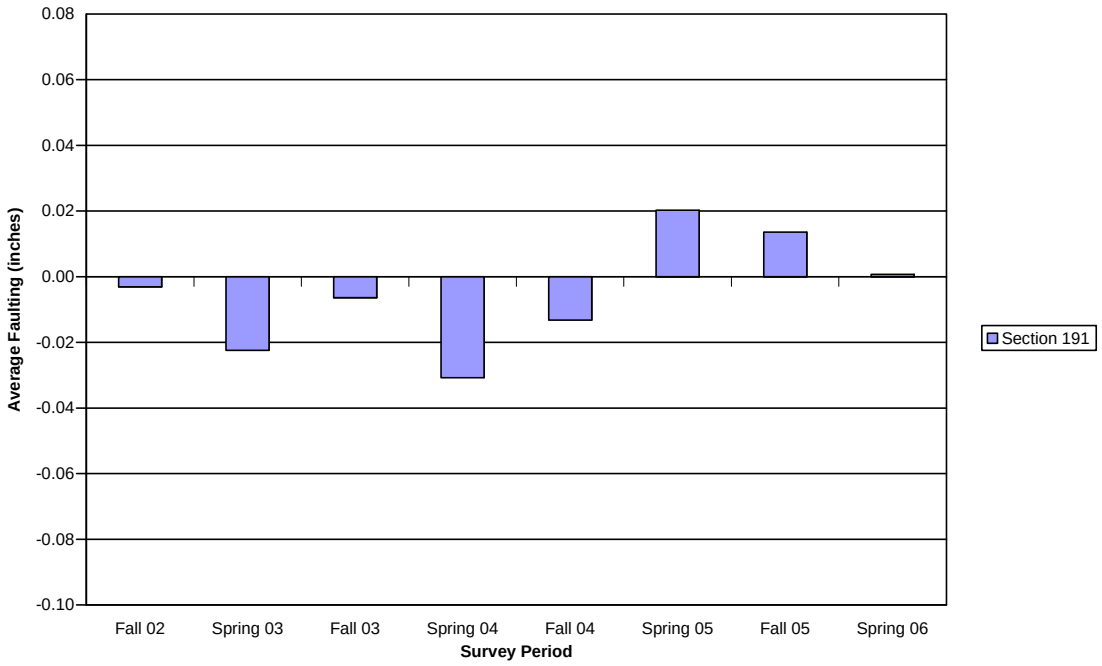

Figure B.29. Faulting, 4.5” depth, remove, no fibers, 6’ panel

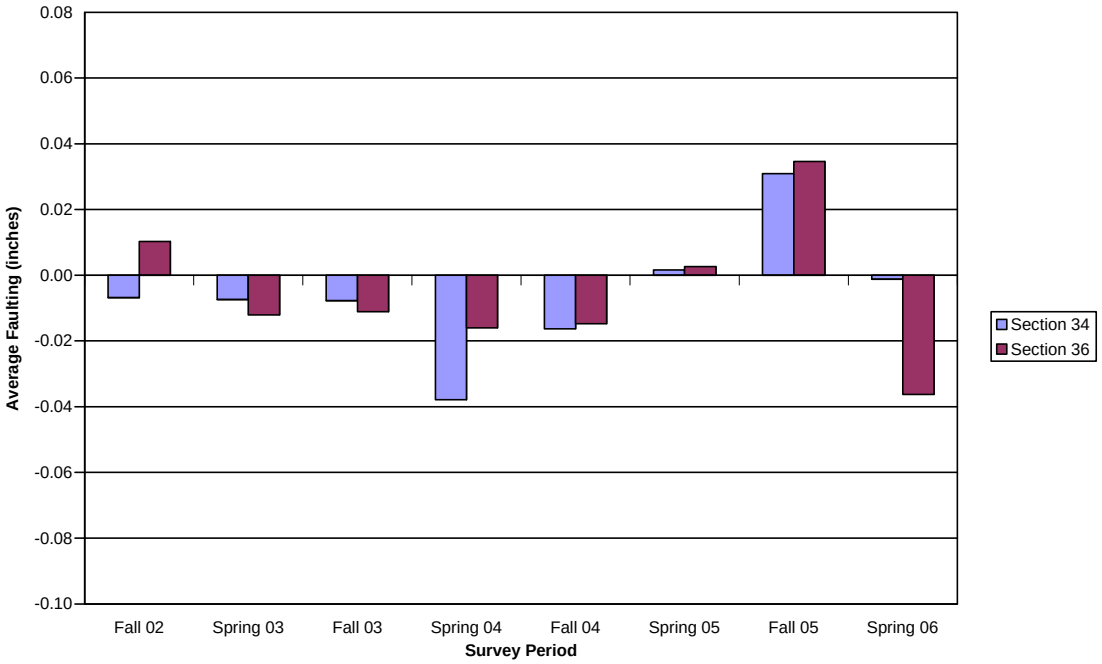

Figure B.30. Faulting, 4.5” depth, scarify, fiber A, 4.5’ panel

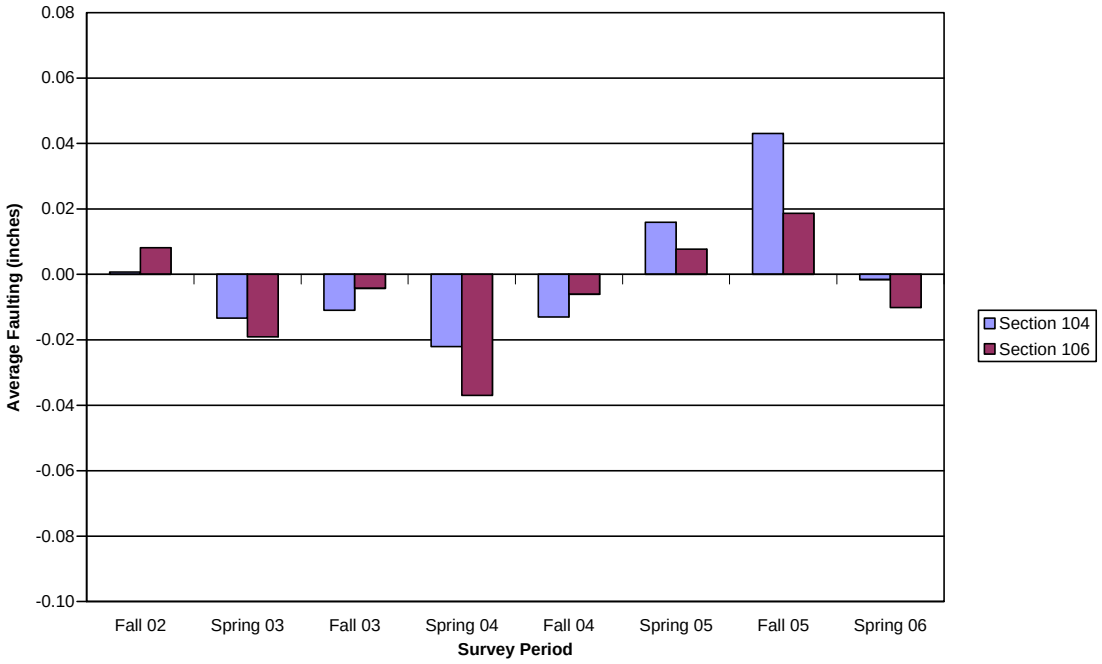

Figure B.31. Faulting, 4.5” depth, HMA S.R., fiber A, 4.5’ panel

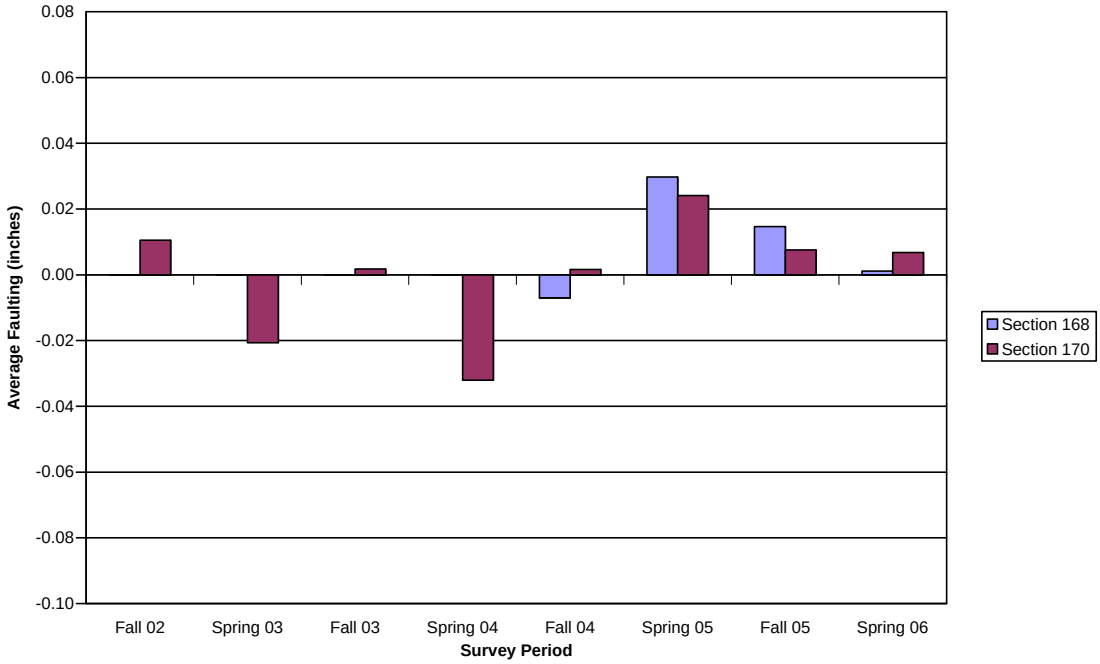

Figure B.32. Faulting, 4.5” depth, patch, fiber A, 4.5’ panel

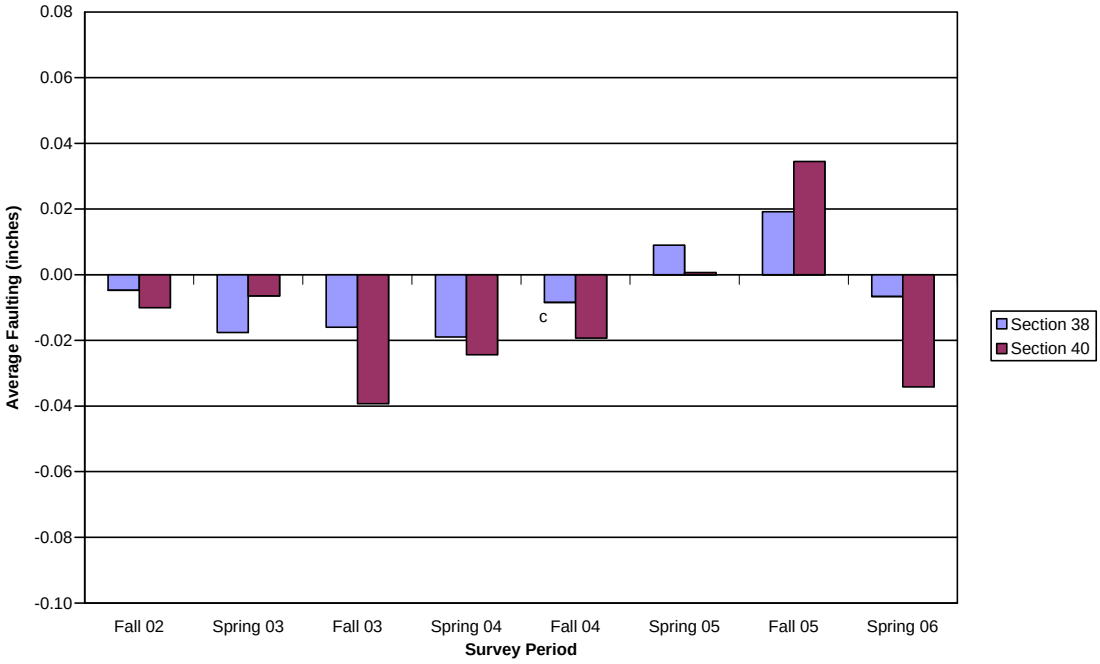

Figure B.33. Faulting, 4.5” depth, scarify, fiber A, 6’ panel

Figure B.34. Faulting, 4.5” depth, HMA S.R., fiber A, 6’ panel

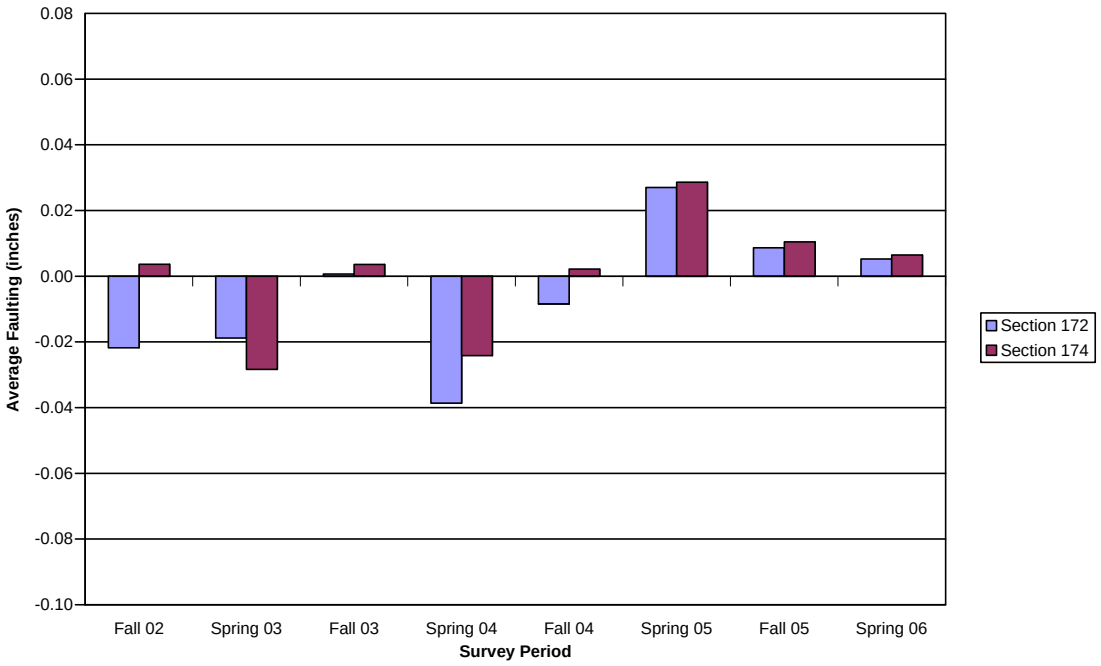

Figure B.35. Faulting, 4.5” depth, patch, fiber A, 6’ panel

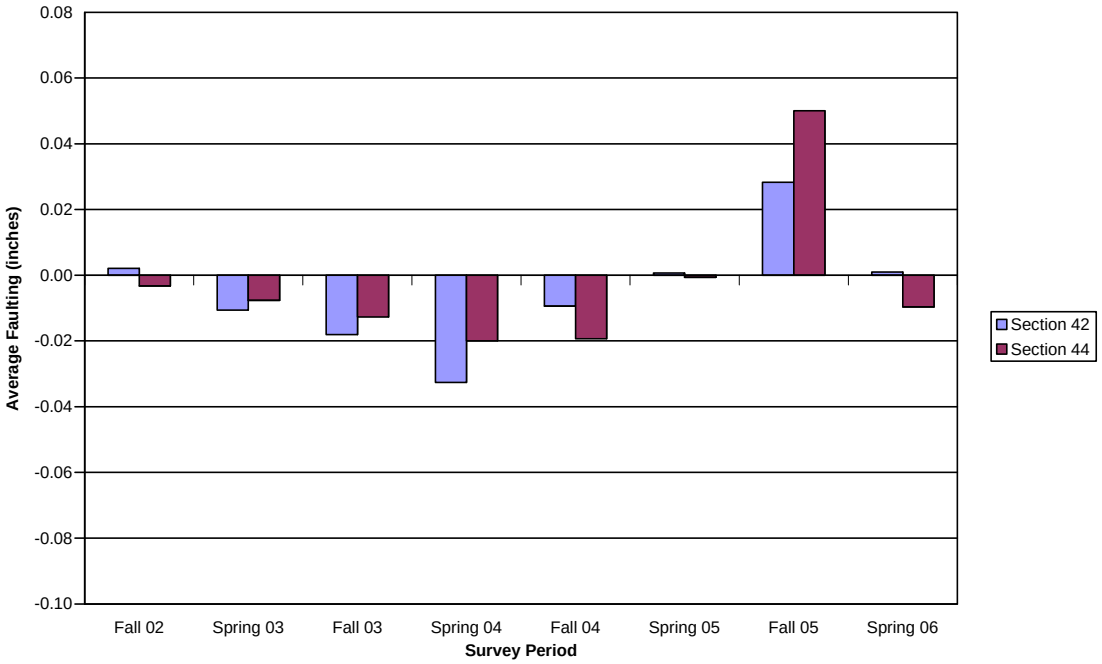

Figure B.36. Faulting, 4.5” depth, scarify, fiber B, 4.5’ panel

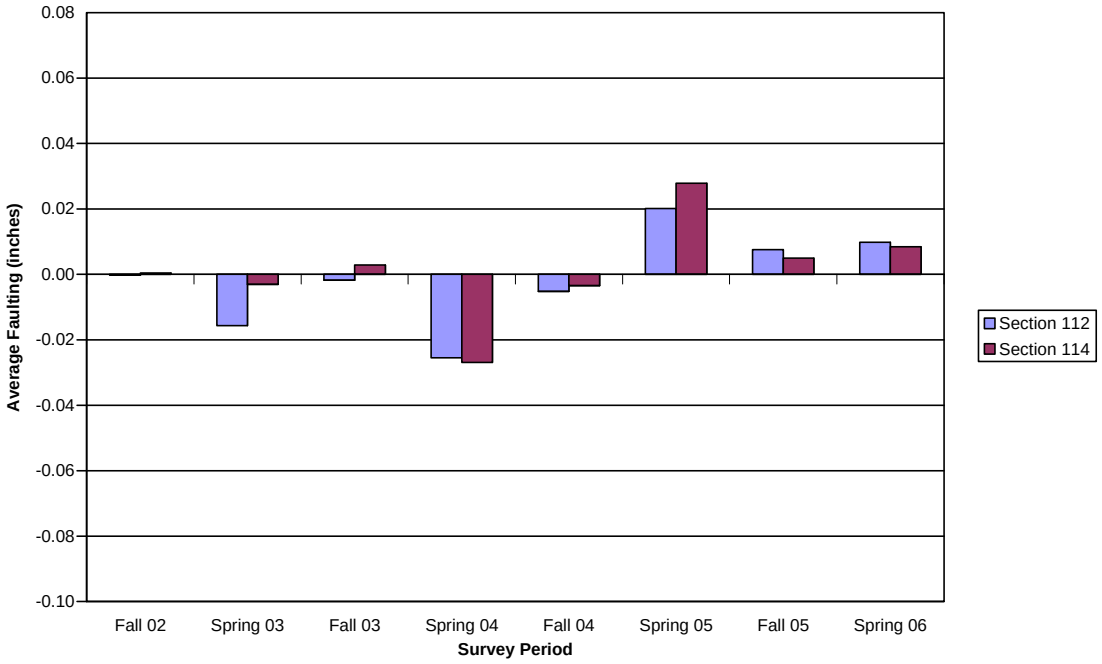

Figure B.37. Faulting, 4.5” depth, HMA S.R., fiber B, 4.5’ panel

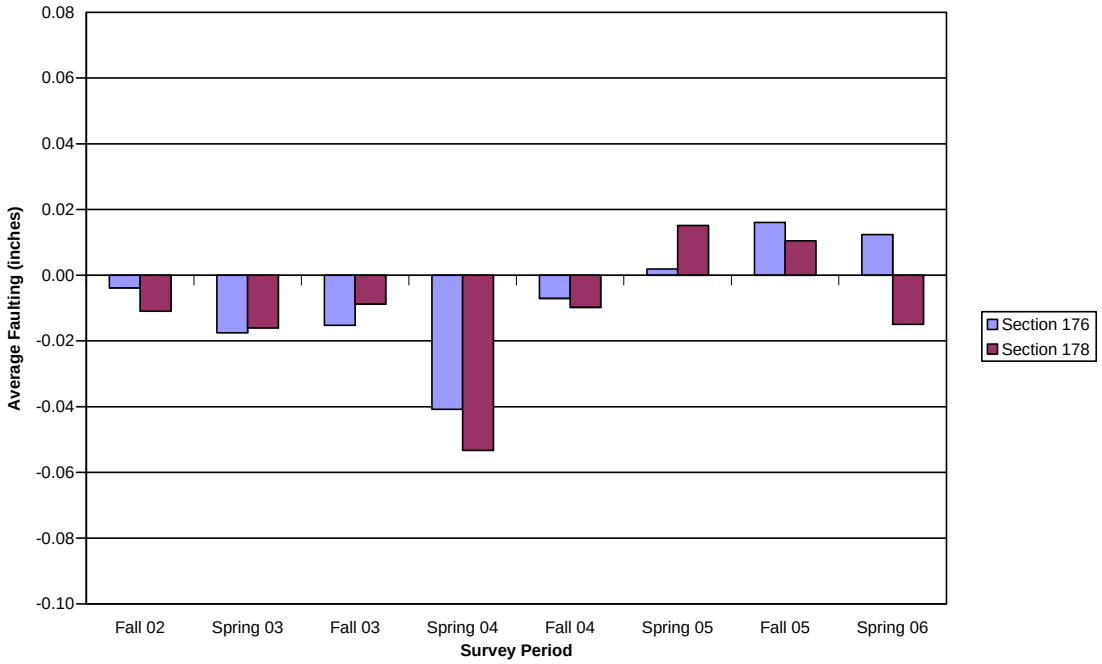

Figure B.38. Faulting, 4.5” depth, patch, fiber B, 4.5’ panel

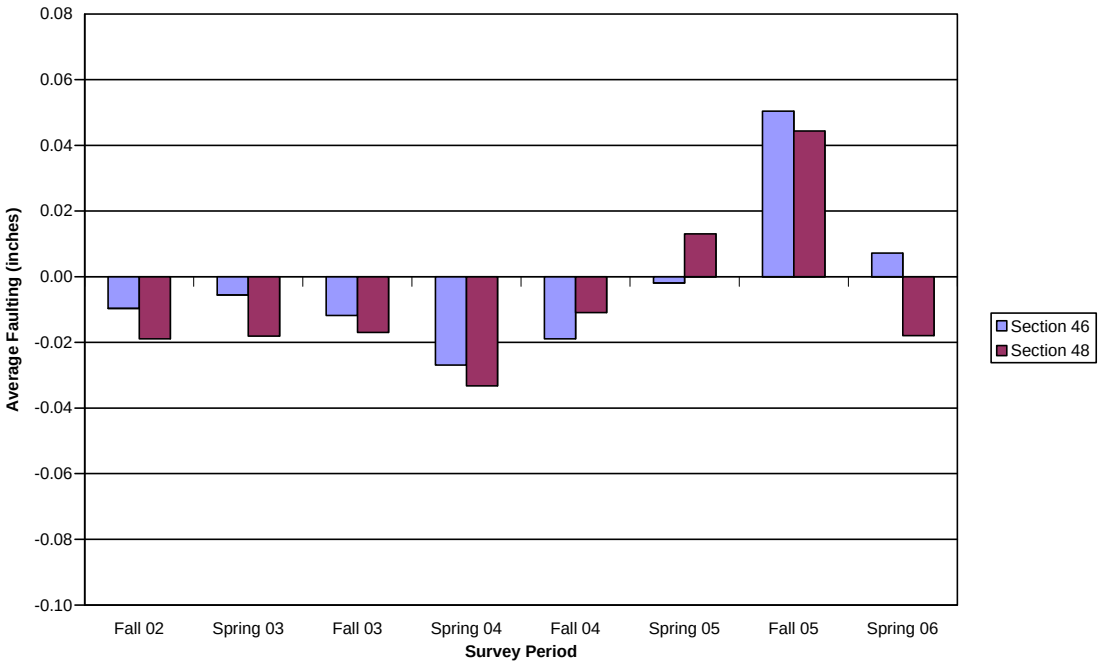

Figure B.39. Faulting, 4.5” depth, scarify, fiber B, 6’ panel

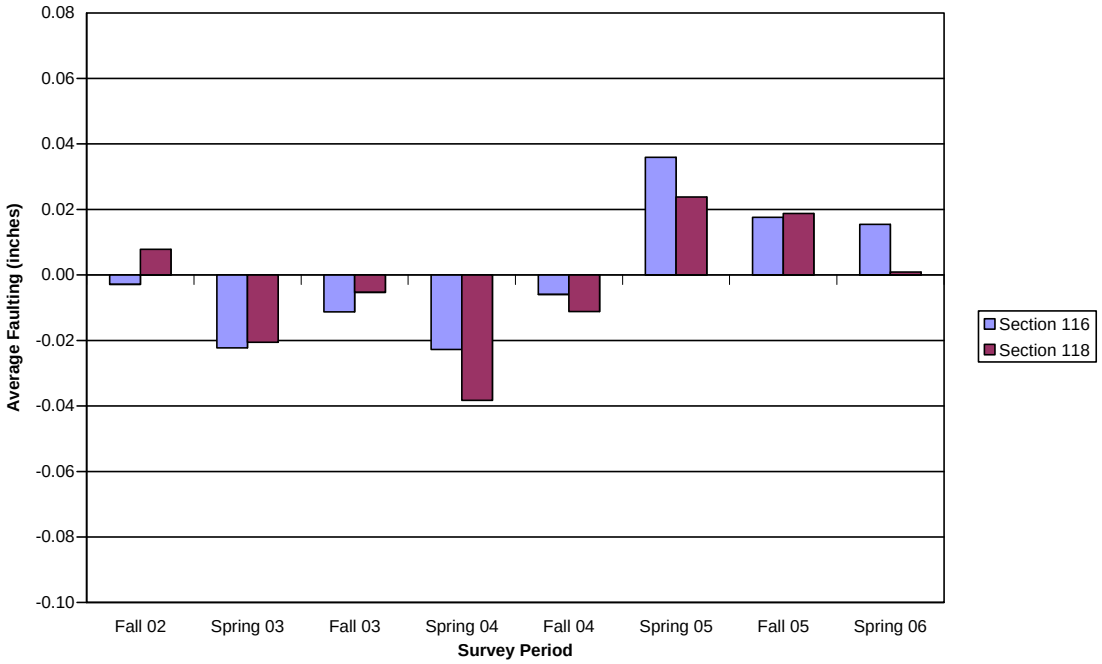

Figure B.40. Faulting, 4.5” depth, HMA S.R., fiber B, 6’ panel

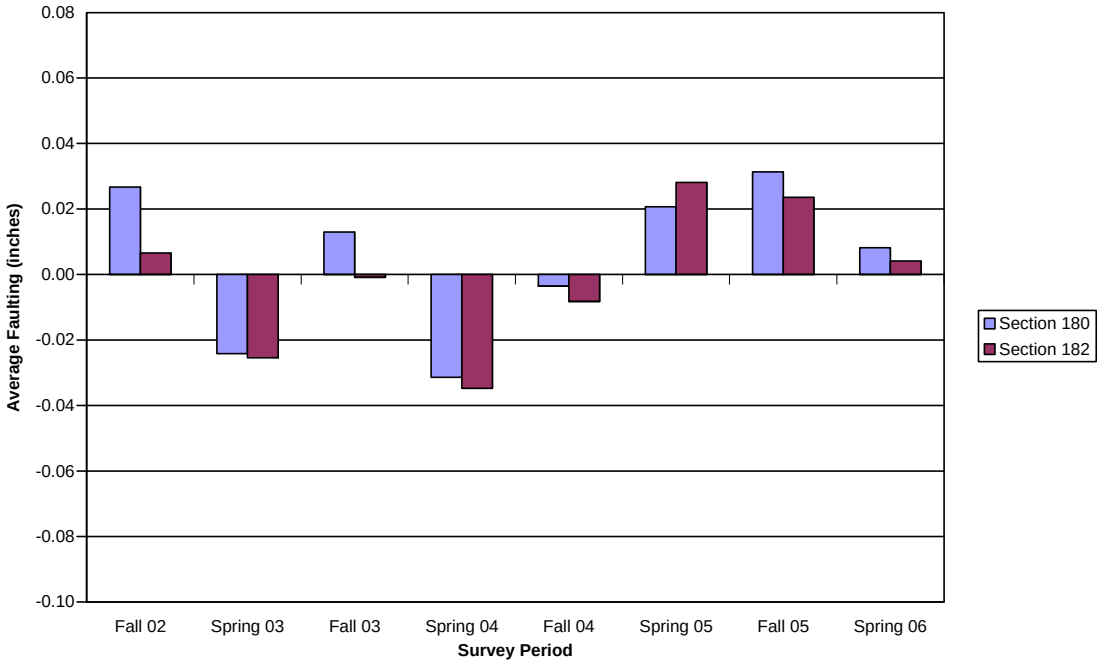

Figure B.41. Faulting, 4.5” depth, patch, fiber B, 6’ panel

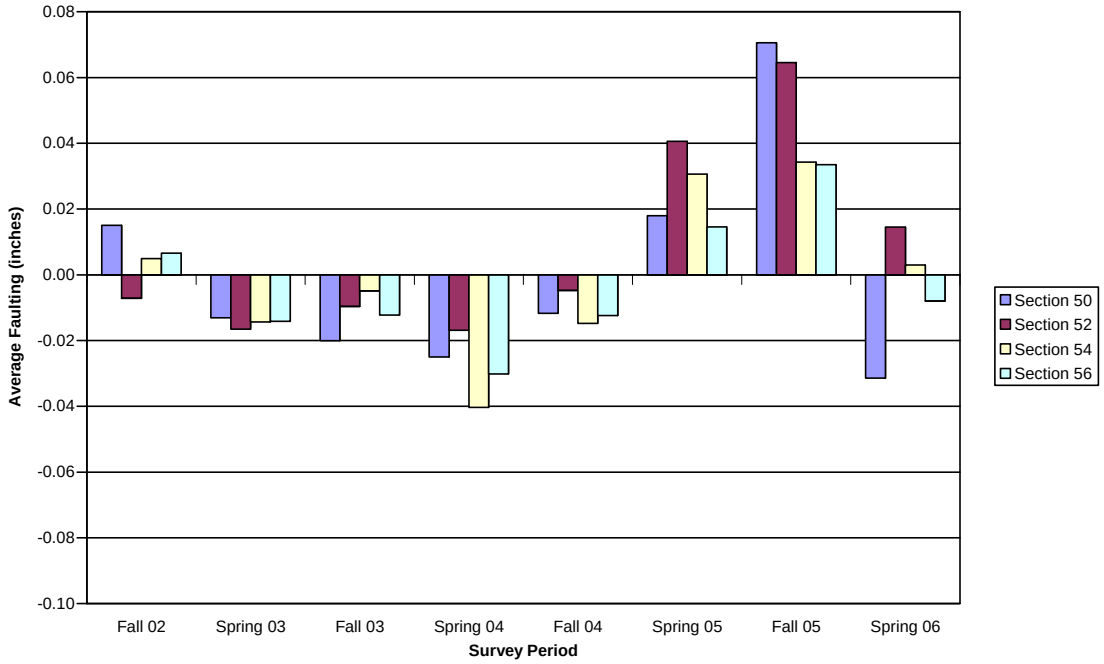

Figure B.42. Faulting, 4.5” depth, scarify, fiber C, 9’ panel

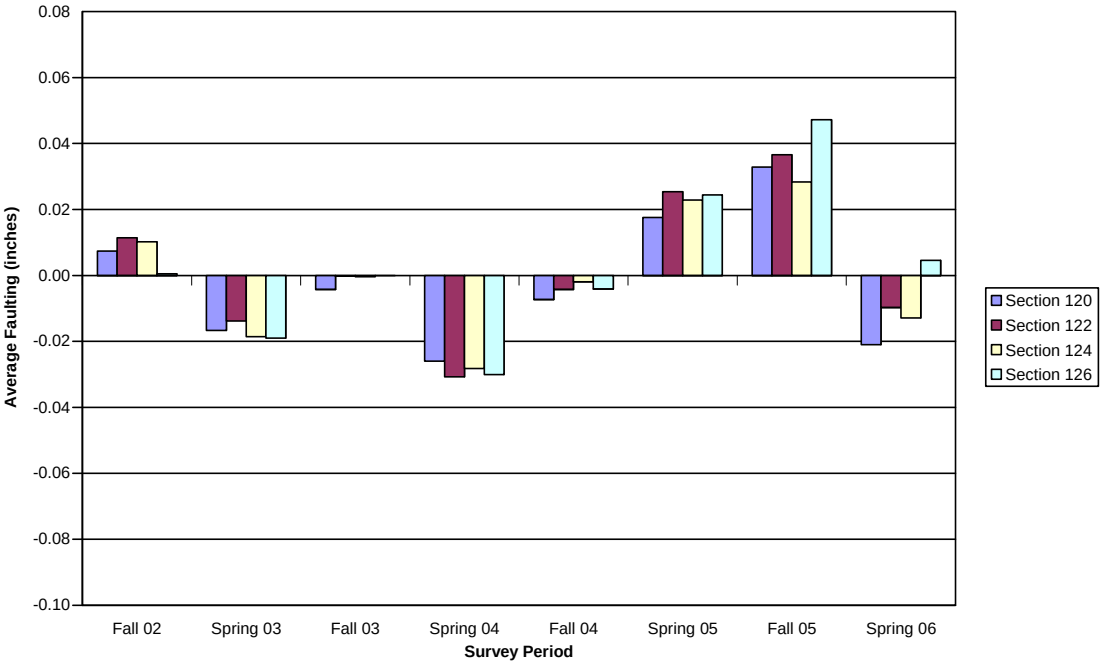

Figure B.43. Faulting, 4.5” depth, HMA S.R., fiber C, 9’ panel

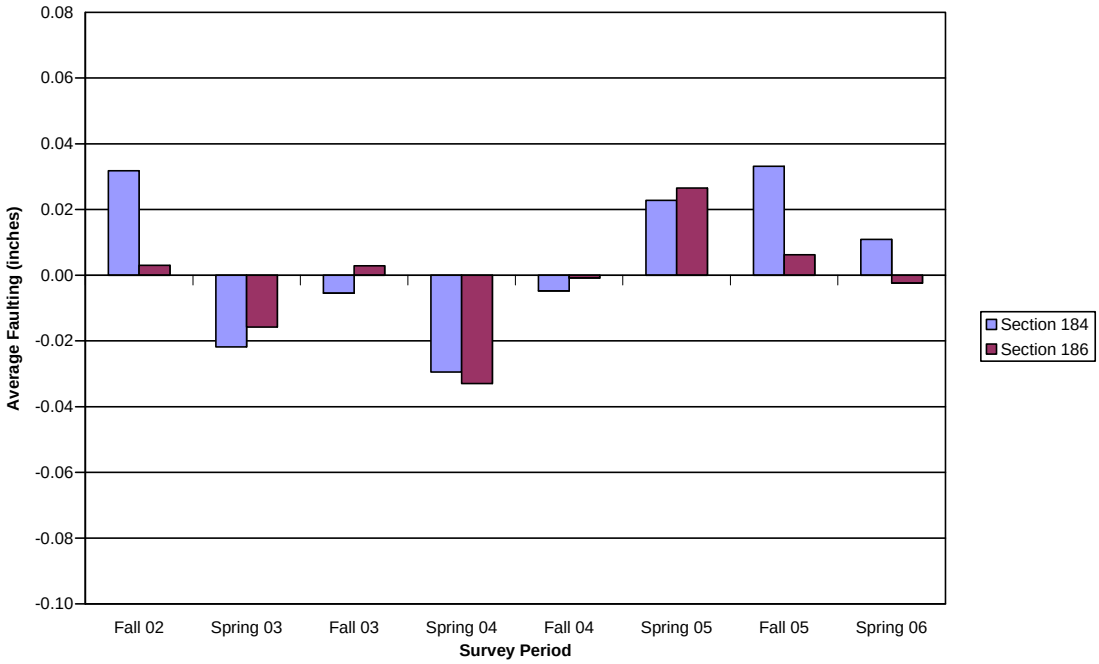

Figure B.44. Faulting, 4.5” depth, patch, fiber C, 9’ panel

APPENDIX C: JOINT MOVEMENT

Table C.1. Joint opening data for overlay 3.5 in. thick

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
A	4.5	Scarify	33	113+50	119+50	**Max.**	1.52	0.76	0.25	0.00	2.93	7.81	0.63
						Min.	-16.26	-1.27	-5.84	0.00	-2.48	-12.77	-0.79
						Avg.	-1.75	-0.28	-1.44	0.00	-0.13	-1.09	-0.12
						Inches	-0.07	-0.01	-0.06	0.00	-0.01	-0.04	0.00
		HMA S. R.	69	209+00	213+00	**Max.**	1.27	1.78	0.51	1.09	1.18	1.52	11.99
						Min.	-1.27	-23.11	-2.54	-2.22	-3.97	-0.61	8.79
						Avg.	0.13	-2.29	-1.14	-0.52	-0.71	0.32	10.46
						Inches	0.01	-0.09	-0.05	-0.02	-0.03	0.01	0.41
			71	214+00	218+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Patch	136	375+00	379+00	**Max.**	0.25	1.78	3.81	4.17	0.89	0.36	1.69
						Min.	-4.06	-2.29	-4.32	-3.00	-2.24	-1.35	-1.84
						Avg.	-1.30	-0.08	0.10	0.46	-0.76	-0.51	-0.60
						Inches	-0.05	0.00	0.00	0.02	-0.03	-0.02	-0.02
			138	380+00	384+00	**Max.**	3.81	28.19	5.08	4.50	1.29	19.78	0.92
						Min.	-24.64	-2.79	-4.32	-2.10	-3.30	-1.89	-2.68
						Avg.	-2.41	2.69	0.10	0.72	-0.38	1.34	-0.87
						Inches	-0.10	0.11	0.00	0.03	-0.02	0.05	-0.03
	6.0	Scarify	31	107+00	113+00	**Max.**	2.54	1.78	0.51	0.00	0.00	0.00	0.00
						Min.	-0.76	-1.78	-2.03	0.00	0.00	0.00	0.00
						Avg.	0.48	0.15	-0.61	0.00	0.00	0.00	0.00
						Inches	0.02	0.01	-0.02	0.00	0.00	0.00	0.00
		HMA S. R.	73	219+00	223+00	**Max.**	1.52	1.52	1.02	0.16	1.59	0.90	11.83
						Min.	0.00	-2.79	-9.91	-2.09	-2.74	-0.20	0.27
						Avg.	0.74	-0.41	-2.21	-0.91	-0.20	0.25	9.41
						Inches	0.03	-0.02	-0.09	-0.04	-0.01	0.01	0.37
			75	224+00	228+00	**Max.**	2.79	1.02	1.52	1.26	1.30	1.14	11.02
						Min.	-2.54	-2.54	-1.52	-1.15	-3.05	-1.33	8.64
						Avg.	0.13	0.03	-0.51	-0.12	-0.56	0.22	10.27
						Inches	0.00	0.00	-0.02	0.00	-0.02	0.01	0.40
		Patch	140	385+00	389+00	**Max.**	9.14	3.30	3.56	3.72	0.59	-0.02	0.75
						Min.	-1.78	-4.32	-2.54	-2.64	-4.09	-2.26	-2.39
						Avg.	0.86	-0.66	0.71	0.44	-1.26	-1.32	-0.78
						Inches	0.03	-0.03	0.03	0.02	-0.05	-0.05	-0.03
			142	390+00	394+00	**Max.**	-0.25	4.06	3.05	1.85	0.57	1.32	0.66
						Min.	-14.99	-2.29	-3.56	-3.97	-2.12	-3.36	-3.96
						Avg.	-2.62	-0.46	0.23	-1.35	-1.01	-1.16	-1.06
						Inches	-0.10	-0.02	0.01	-0.05	-0.04	-0.05	-0.04
B	4.5	Scarify	9	52+00	56+00	**Max.**	4.57	2.03	0.25	1.17	0.00	0.00	1.55
						Min.	-0.76	-2.03	-2.54	-2.85	0.00	0.00	-1.16
						Avg.	1.09	0.23	-0.61	-0.97	0.00	0.00	0.18
						Inches	0.04	0.01	-0.02	-0.04	0.00	0.00	0.01
		HMA S. R.	77	229+00	233+00	**Max.**	1.52	0.76	2.54	5.66	1.31	4.60	12.36
						Min.	-0.76	-0.76	-3.30	-1.44	-1.65	-3.80	9.90
						Avg.	0.36	-0.05	-0.51	0.69	-0.06	0.57	10.78

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
						Inches	0.01	0.00	-0.02	0.03	0.00	0.02	0.42
			79	234+00	238+00	**Max.**	14.22	23.88	0.00	1.04	2.09	0.90	11.04
						Min.	-1.52	-2.54	-3.56	-2.36	-1.99	-30.10	9.21
						Avg.	1.50	1.47	-1.07	-0.53	0.11	-3.15	10.24
						Inches	0.06	0.06	-0.04	-0.02	0.00	-0.12	0.40
		Patch	144	395+00	399+00	**Max.**	8.13	24.38	3.81	2.66	-0.12	0.99	0.62
						Min.	-3.56	-4.06	-7.37	-3.01	-10.35	-3.10	-3.54
						Avg.	0.28	1.22	0.58	0.74	-2.24	-0.78	-0.87
						Inches	0.01	0.05	0.02	0.03	-0.09	-0.03	-0.03
			146	400+00	404+00	**Max.**	0.76	3.05	3.05	7.98	0.49	0.59	2.23
						Min.	-3.81	-4.57	-5.08	-6.32	-3.09	-3.27	-2.95
						Avg.	-0.76	-0.20	-0.91	0.41	-1.00	-1.03	-1.03
						Inches	-0.03	-0.01	-0.04	0.02	-0.04	-0.04	-0.04
	6.0	Scarify	11	57+00	61+00	**Max.**	1.27	9.91	0.25	2.69	4.17	8.52	1.69
						Min.	-2.54	-1.02	-2.03	-3.21	-3.39	-1.18	-1.42
						Avg.	-0.38	1.19	-0.86	-0.67	-0.08	2.40	0.20
						Inches	-0.02	0.05	-0.03	-0.03	0.00	0.09	0.01
			13	62+00	66+00	**Max.**	1.78	1.27	0.51	6.50	2.96	1.50	13.93
						Min.	-0.25	-25.91	-2.79	-2.25	-1.47	-0.57	-8.03
						Avg.	0.69	-3.99	-0.99	0.55	0.46	0.56	0.79
						Inches	0.03	-0.16	-0.04	0.02	0.02	0.02	0.03
		HMA S. R.	81	239+00	243+00	**Max.**	2.03	1.78	1.27	0.31	2.20	11.66	13.55
						Min.	-0.51	-2.03	-2.54	-1.76	-0.94	-0.64	9.46
						Avg.	0.56	-0.41	-0.64	-0.63	0.03	1.57	10.29
						Inches	0.02	-0.02	-0.03	-0.02	0.00	0.06	0.41
			83	244+00	248+00	**Max.**	25.65	1.78	3.05	0.68	2.34	1.24	11.44
						Min.	0.25	-1.52	-3.56	-3.41	-4.22	-0.87	9.56
						Avg.	3.28	0.05	-0.53	-0.96	-0.21	0.44	10.61
						Inches	0.13	0.00	-0.02	-0.04	-0.01	0.02	0.42
		Patch	148	405+00	409+00	**Max.**	3.30	3.56	3.81	4.25	1.93	0.68	1.35
						Min.	-2.54	-2.79	-3.05	-2.59	-2.30	-2.06	-1.79
						Avg.	0.08	-0.43	0.20	0.13	-0.30	-0.82	-0.70
						Inches	0.00	-0.02	0.01	0.01	-0.01	-0.03	-0.03
			150	410+00	414+00	**Max.**	1.52	2.29	3.56	4.23	2.36	0.53	1.49
						Min.	-7.62	-2.29	-2.29	-3.36	-46.11	-2.01	-1.66
						Avg.	-0.86	-0.89	0.51	0.42	-4.70	-0.63	-0.64
						Inches	-0.03	-0.04	0.02	0.02	-0.18	-0.02	-0.03
C	6.0		15	67+00	71+00	**Max.**	2.03	2.54	1.02	2.34	2.89	2.58	2.76
						Min.	-0.51	-1.27	-2.79	-4.31	-51.24	-4.87	-0.63
						Avg.	0.94	1.02	-0.86	-0.16	-8.40	0.36	0.31
						Inches	0.04	0.04	-0.03	-0.01	-0.33	0.01	0.01
			17	72+00	76+00	**Max.**	2.54	3.56	0.00	2.59	2.57	6.53	1.60
						Min.	-1.52	-1.78	-2.29	-3.72	-2.01	-1.04	-1.18
						Avg.	0.89	0.99	-1.40	-0.53	0.39	0.86	0.19
		Scarify				**Inches**	0.03	0.04	-0.06	-0.02	0.02	0.03	0.01
			19	77+00	81+00	**Max.**	0.76	2.79	0.76	10.77	0.77	2.53	1.74
						Min.	-2.54	-0.51	-3.05	-2.13	-2.76	-1.21	-0.96
						Avg.	0.00	0.86	-1.07	0.30	-0.66	0.19	0.22
						Inches	0.00	0.03	-0.04	0.01	-0.03	0.01	0.01
			21	82+00	86+00	**Max.**	1.02	1.78	0.76	1.75	1.33	1.69	0.65
						Min.	-8.64	-7.62	-10.16	-8.94	-9.85	-8.05	-8.36
						Avg.	-0.53	-0.25	-1.14	-1.28	-1.81	-0.62	-1.03
						Inches	-0.02	-0.01	-0.05	-0.05	-0.07	-0.02	-0.04

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
		Patch	152	415+00	419+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			154	420+00	424+00	**Max.**	3.56	0.00	11.18	2.69	0.86	0.25	0.42
						Min.	-6.60	-5.59	-6.35	-6.48	-6.37	-5.57	-6.85
						Avg.	-1.96	-2.69	0.13	-1.88	-2.31	-2.39	-2.37
						Inches	-0.08	-0.11	0.01	-0.07	-0.09	-0.09	-0.09
			156	425+00	429+00	**Max.**	2.79	1.27	4.32	23.29	1.06	0.78	0.52
						Min.	-16.51	-1.02	-0.51	-0.85	-1.89	-1.92	-2.28
						Avg.	-1.22	0.03	1.78	2.83	-0.01	-0.60	-0.77
						Inches	-0.05	0.00	0.07	0.11	0.00	-0.02	-0.03
			158	430+00	434+00	**Max.**	3.05	2.54	4.57	4.16	2.34	0.70	0.85
						Min.	-24.13	-1.27	-4.32	-2.44	-0.93	-2.15	-1.93
						Avg.	-1.75	0.51	1.12	1.28	0.13	-0.68	-0.52
						Inches	-0.07	0.02	0.04	0.05	0.01	-0.03	-0.02
	9.0	HMA S. R.	85	249+00	253+00	**Max.**	1.78	0.51	1.52	1.84	1.25	2.96	21.32
						Min.	-16.00	-1.52	-3.81	-2.19	-6.07	-0.60	9.07
						Avg.	-2.77	-0.40	-0.99	-0.08	-0.84	0.38	12.20
						Inches	-0.11	-0.02	-0.04	0.00	-0.03	0.01	0.48
			87	254+00	258+00	**Max.**	1.52	1.02	0.76	2.07	2.51	20.24	11.44
						Min.	-24.89	-2.03	-3.05	-2.17	-3.18	-2.41	8.88
						Avg.	-2.13	-0.41	-0.89	0.02	-0.76	1.49	10.28
						Inches	-0.08	-0.02	-0.03	0.00	-0.03	0.06	0.40
			91	265+00	269+00	**Max.**	1.27	0.76	53.59	0.94	1.94	-0.42	11.44
						Min.	-1.27	-25.91	-3.56	-3.17	-12.18	-3.00	7.93
						Avg.	0.41	-3.02	4.93	-1.37	-1.90	-1.64	9.86
						Inches	0.02	-0.12	0.19	-0.05	-0.07	-0.06	0.39
			93	270+00	274+00	**Max.**	2.03	2.03	0.76	1.88	1.28	20.93	11.10
						Min.	-2.79	-1.52	-4.06	-2.65	-2.49	-41.48	8.13
						Avg.	0.61	-0.15	-1.09	-0.27	-0.30	-2.80	10.17
						Inches	0.02	-0.01	-0.04	-0.01	-0.01	-0.11	0.40
No	4.5	Scarify	23	87+00	91+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			25	92+00	96+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		HMA S. R.	95	275+00	279+00	**Max.**	26.67	26.42	25.91	25.72	25.27	25.18	37.58
						Min.	-29.72	-28.45	-28.45	-29.13	-29.14	-30.90	-17.80
						Avg.	-0.34	-0.45	-3.26	-1.24	-1.25	-2.05	9.97
						Inches	-0.01	-0.02	-0.13	-0.05	-0.05	-0.08	0.39
			98	280+00	284+00	**Max.**	7.37	24.89	21.59	2.36	1.09	20.58	11.19
						Min.	-1.78	-1.78	-1.27	-5.19	-3.17	-3.62	8.98
						Avg.	0.66	1.73	2.01	-1.11	-0.73	0.40	10.05
						Inches	0.03	0.07	0.08	-0.04	-0.03	0.02	0.40
		Patch	160	435+00	439+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			162	440+00	444+00	**Max.**	3.81	2.03	3.30	3.73	1.93	1.81	1.32
						Min.	-26.42	-2.79	-2.79	-1.60	-2.19	-2.85	-3.52
						Avg.	-1.02	0.03	0.43	1.01	-0.52	-0.64	-0.65
						Inches	-0.04	0.00	0.02	0.04	-0.02	-0.03	-0.03

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
		Remove	89	259+75	263+25	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6.0	Scarify	27	97+00	101+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			29	102+00	106+00	**Max.**	1.02	2.79	1.27	2.20	1.52	0.91	0.55
						Min.	-16.51	-1.52	-4.06	-3.26	-2.73	-1.30	-1.39
						Avg.	-1.40	0.00	-0.76	-0.01	-0.57	0.12	-0.23
						Inches	-0.06	0.00	-0.03	0.00	-0.02	0.00	-0.01
		HMA S. R.	100	285+00	289+00	**Max.**	24.64	24.89	22.61	22.65	28.23	24.46	35.00
						Min.	-2.29	-2.03	-4.06	-5.98	-2.99	-2.75	8.67
						Avg.	1.85	1.50	0.91	0.80	3.91	1.17	12.15
						Inches	0.07	0.06	0.04	0.03	0.15	0.05	0.48
			102	290+00	294+00	**Max.**	17.53	0.25	0.25	1.47	1.43	0.08	11.71
						Min.	-1.02	-1.78	-3.56	-3.82	-3.98	-3.62	8.97
						Avg.	1.40	-0.91	-1.55	-1.59	-1.63	-1.63	10.17
						Inches	0.06	-0.04	-0.06	-0.06	-0.06	-0.06	0.40
		Patch	164	445+00	449+00	**Max.**	4.57	0.51	1.78	3.31	0.84	1.91	0.77
						Min.	-2.79	-2.54	-3.56	-3.20	-4.10	-4.34	-2.76
						Avg.	-0.13	-0.53	-0.41	0.44	-1.57	-1.10	-1.39
						Inches	0.00	-0.02	-0.02	0.02	-0.06	-0.04	-0.05
			166	450+00	454+00	**Max.**	2.29	1.52	1.78	3.80	-0.01	0.56	0.89
						Min.	-3.30	-1.27	-3.56	-2.69	-4.26	-4.12	-3.45
						Avg.	-1.09	0.00	-0.51	-0.31	-1.48	-1.24	-1.28
						Inches	-0.04	0.00	-0.02	-0.01	-0.06	-0.05	-0.05

Table C.2. Joint opening data for overlay 4.5 in. thick

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
A	4.5	Scarify	34	120+00	124+00	**Max.**	1.52	11.43	0.76	1.88	5.47	1.03	1.20
						Min.	0.00	-1.78	-2.79	-2.60	-2.84	-1.08	-0.78
						Avg.	0.69	1.09	-0.48	-0.01	-0.13	0.26	0.19
						Inches	0.03	0.04	-0.02	0.00	-0.01	0.01	0.01
			36	125+00	129+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		HMA S. R.	104	295+00	299+00	**Max.**	0.76	0.76	0.00	0.23	2.58	0.76	10.92
						Min.	-1.27	-1.02	-2.03	-2.96	-1.72	-2.99	9.11
						Avg.	-0.25	0.08	-1.14	-1.66	-0.59	-1.10	10.19
						Inches	-0.01	0.00	-0.04	-0.07	-0.02	-0.04	0.40
			106	300+00	304+00	**Max.**	2.03	0.76	3.05	1.67	1.34	0.87	10.97
						Min.	-1.27	-1.52	-3.05	-0.65	-2.17	-1.72	9.14
						Avg.	0.28	-0.10	-0.05	0.08	-0.50	-0.70	10.09
						Inches	0.01	0.00	0.00	0.00	-0.02	-0.03	0.40
		Patch	168	455+00	459+00	**Max.**	3.81	1.78	4.06	0.00	0.00	0.00	0.00
						Min.	-3.56	-3.05	-1.52	0.00	0.00	0.00	0.00
						Avg.	0.23	-0.66	1.65	0.00	0.00	0.00	0.00
						Inches	0.01	-0.03	0.07	0.00	0.00	0.00	0.00

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
			170	459+50	463+50	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Scarify	38	130+00	134+00	**Max.**	2.03	2.03	1.02	2.84	2.31	3.38	1.71
						Min.	0.51	-0.76	-1.52	-1.21	-1.04	-0.34	-1.69
						Avg.	1.07	0.66	-0.46	0.37	0.38	0.88	0.31
						Inches	0.04	0.03	-0.02	0.01	0.01	0.03	0.01
			40	135+00	139+00	**Max.**	16.00	2.29	0.76	2.73	1.02	1.99	12.01
						Min.	-1.27	-1.27	-1.52	-2.58	-0.75	-0.75	-8.90
						Avg.	2.11	0.61	-0.20	0.03	-0.01	0.43	8.72
						Inches	0.08	0.02	-0.01	0.00	0.00	0.02	0.34
	6.0	HMA S. R.	108	305+00	309+00	**Max.**	15.24	25.40	1.78	1.91	0.66	-0.48	11.34
						Min.	-0.76	-1.52	-5.59	-2.77	-2.31	-40.81	8.94
						Avg.	2.24	2.44	-1.19	-0.92	-0.65	-5.11	10.22
						Inches	0.09	0.10	-0.05	-0.04	-0.03	-0.20	0.40
			110	310+00	314+00	**Max.**	1.02	0.25	1.27	4.39	1.11	0.55	15.88
						Min.	-25.40	-1.78	-2.79	-2.74	-3.18	-2.39	9.01
						Avg.	-3.76	-0.69	-1.17	-0.63	-1.02	-1.33	10.67
						Inches	-0.15	-0.03	-0.05	-0.02	-0.04	-0.05	0.42
		Patch	172	464+00	468+00	**Max.**	3.56	1.78	6.86	2.02	1.68	1.22	6.27
						Min.	-2.79	-1.52	-4.06	-1.90	-3.25	-3.18	-2.12
						Avg.	0.25	-0.05	1.93	0.09	0.10	-0.75	0.01
						Inches	0.01	0.00	0.08	0.00	0.00	-0.03	0.00
			174	468+50	472+50	**Max.**	4.57	2.03	3.81	6.88	1.99	1.20	0.18
						Min.	-3.81	-3.05	-0.76	-2.99	-2.97	-4.21	-4.66
						Avg.	0.25	-0.51	1.35	1.08	-0.07	-0.80	-1.08
						Inches	0.01	-0.02	0.05	0.04	0.00	-0.03	-0.04
B		Scarify	42	140+00	144+00	**Max.**	29.21	28.19	25.65	28.25	27.42	29.06	53.30
						Min.	-27.43	-29.97	-29.21	-29.19	-26.73	-27.93	-32.37
						Avg.	-2.46	-0.18	-0.56	-0.60	-0.82	0.35	11.91
						Inches	-0.10	-0.01	-0.02	-0.02	-0.03	0.01	0.47
			44	145+00	149+00	**Max.**	26.16	3.81	4.32	2.55	3.62	2.32	11.57
						Min.	-1.27	-2.54	-3.56	-1.56	-4.16	-1.52	9.40
						Avg.	3.20	0.46	-0.05	0.14	-0.58	0.51	10.92
						Inches	0.13	0.02	0.00	0.01	-0.02	0.02	0.43
		HMA S. R.	112	315+00	319+00	**Max.**	2.29	0.76	1.27	0.94	18.36	1.80	10.73
						Min.	-12.95	-2.79	-3.05	-3.18	-2.42	-3.04	8.71
						Avg.	-1.32	-0.71	-1.17	-0.73	0.52	-1.66	9.98
						Inches	-0.05	-0.03	-0.05	-0.03	0.02	-0.07	0.39
	4.5		114	320+00	324+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Patch	176	473+00	477+00	**Max.**	4.83	2.03	5.08	5.63	1.74	1.23	1.53
						Min.	-13.72	-2.79	-2.03	-3.72	-2.87	-3.05	-3.35
						Avg.	-1.41	0.56	1.10	0.68	-0.61	-1.22	-0.77
						Inches	-0.06	0.02	0.04	0.03	-0.02	-0.05	-0.03
			178	477+50	481+50	**Max.**	2.79	2.54	7.11	1.55	1.65	1.63	0.89
						Min.	-2.79	-2.29	-1.78	-1.33	-1.83	-2.85	-2.37
						Avg.	0.15	0.05	0.63	-0.02	-0.34	-0.20	-0.50
						Inches	0.01	0.00	0.02	0.00	-0.01	-0.01	-0.02
	6.0	Scarify	46	150+00	154+00	**Max.**	15.49	1.78	0.76	6.09	1.26	1.99	12.22
						Min.	0.00	-2.29	-3.30	-2.12	-9.72	-0.45	9.03
						Avg.	2.41	0.33	-0.89	0.77	-0.92	0.78	10.66
						Inches	0.09	0.01	-0.03	0.03	-0.04	0.03	0.42
			48	155+00	159+00	**Max.**	1.52	7.11	0.51	1.45	9.96	1.58	12.21

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
						Min.	-24.38	-1.78	-2.29	-4.53	-2.55	-1.00	9.53
						Avg.	-2.18	0.66	-0.48	-0.92	0.10	0.50	10.60
						Inches	-0.09	0.03	-0.02	-0.04	0.00	0.02	0.42
			116	325+00	329+00	**Max.**	1.52	3.05	0.76	7.18	1.69	0.57	12.44
						Min.	-1.27	-1.78	-1.27	-2.33	-0.72	-1.87	-41.05
						Avg.	0.25	0.03	-0.25	1.05	0.49	-0.59	5.35
		HMA S. R.				**Inches**	0.01	0.00	-0.01	0.04	0.02	-0.02	0.21
			118	330+00	334+00	**Max.**	1.27	0.00	1.78	9.70	1.36	0.92	11.44
						Min.	-1.78	-1.27	-2.29	-2.02	-3.47	-2.14	8.97
						Avg.	0.23	-0.48	-0.66	0.84	-0.86	-0.82	10.19
						Inches	0.01	-0.02	-0.03	0.03	-0.03	-0.03	0.40
			180	482+00	486+00	**Max.**	6.10	2.03	5.59	2.38	0.50	0.05	0.67
						Min.	-5.33	-3.30	-4.57	-3.04	-7.16	-3.64	-4.11
						Avg.	1.45	-0.76	0.84	-0.11	-1.88	-0.89	-1.03
		Patch				**Inches**	0.06	-0.03	0.03	0.00	-0.07	-0.04	-0.04
			182	486+50	490+50	**Max.**	8.64	3.56	3.05	4.25	1.08	1.85	0.83
						Min.	-4.32	-2.54	-24.38	-1.68	-2.64	-2.56	-2.74
						Avg.	1.27	0.53	-2.34	1.18	-0.29	-0.45	-0.57
						Inches	0.05	0.02	-0.09	0.05	-0.01	-0.02	-0.02
C	9.0		50	160+00	164+00	**Max.**	2.54	1.52	2.54	1.15	4.64	1.63	11.01
						Min.	0.00	-1.27	-2.03	-2.32	-2.58	-0.19	10.29
						Avg.	0.97	0.00	-0.20	-0.64	0.98	0.56	10.66
						Inches	0.04	0.00	-0.01	-0.03	0.04	0.02	0.42
			52	165+00	169+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Scarify				**Inches**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			54	170+00	174+00	**Max.**	2.03	1.52	1.27	0.00	2.55	1.61	11.77
						Min.	-0.25	-1.27	-3.05	0.00	-2.50	-1.28	8.55
						Avg.	0.58	0.20	-1.02	0.00	0.14	0.65	10.57
						Inches	0.02	0.01	-0.04	0.00	0.01	0.03	0.42
			56	175+00	179+00	**Max.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			120	335+00	339+00	**Max.**	1.27	1.27	0.25	2.42	3.22	2.06	12.14
						Min.	-0.51	-1.02	-2.79	-4.38	-2.93	-1.91	7.82
						Avg.	0.41	-0.03	-0.74	-0.12	-0.60	-0.67	10.36
						Inches	0.02	0.00	-0.03	0.00	-0.02	-0.03	0.41
			122	340+00	344+00	**Max.**	17.53	2.29	3.05	1.57	0.91	0.69	10.73
						Min.	-6.35	-2.29	-1.27	-2.60	-2.44	-1.68	7.94
						Avg.	1.19	-0.30	0.74	-0.87	-0.72	-0.90	9.74
		HMA S. R.				**Inches**	0.05	-0.01	0.03	-0.03	-0.03	-0.04	0.38
			124	345+00	349+00	**Max.**	0.76	1.78	0.76	0.48	0.98	1.91	11.51
						Min.	-1.02	-1.27	-3.05	-4.77	-1.62	-2.09	-19.10
						Avg.	-0.08	0.41	-0.61	-1.06	-0.24	-0.44	7.27
						Inches	0.00	0.02	-0.02	-0.04	-0.01	-0.02	0.29
			126	350+00	354+00	**Max.**	3.56	1.27	4.32	2.92	1.10	1.35	11.30
						Min.	-2.29	-1.52	-1.52	-4.94	-3.44	-2.28	8.49
						Avg.	0.71	-0.36	0.71	-0.27	-0.19	-0.79	10.28
						Inches	0.03	-0.01	0.03	-0.01	-0.01	-0.03	0.40
		Patch	184	491+00	495+00	**Max.**	2.79	3.81	8.13	6.75	3.16	3.19	1.98
						Min.	-1.02	-3.81	-5.59	-1.00	-2.93	-3.97	-4.35
						Avg.	0.97	-0.03	0.18	0.95	-0.80	-0.56	-0.47
						Inches	0.04	0.00	0.01	0.04	-0.03	-0.02	-0.02
			186	495+50	499+50	**Max.**	2.79	6.10	7.11	1.66	3.05	6.32	2.72
						Min.	-1.52	-1.52	-4.83	-3.17	-2.77	-3.35	-3.77

Fiber Type	Panel Size	Surface Prep.	Section	Station			Joint Opening, mm						
				Beg.	End		Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06
						Avg.	0.74	0.58	0.36	-0.22	-0.28	-0.28	-1.08
						Inches	0.03	0.02	0.01	-0.01	-0.01	-0.01	-0.04
						Max.	2.54	3.05	1.52	2.29	1.62	4.75	12.21
			61	189+00	193+00	**Min.**	0.00	-1.52	-2.54	-4.74	-1.57	-1.93	9.97
						Avg.	1.17	0.56	-0.58	0.32	0.25	1.00	11.14
		Scarify				**Inches**	0.05	0.02	-0.02	0.01	0.01	0.04	0.44
						Max.	32.77	1.27	0.76	2.95	0.28	1.63	39.40
			63	194+00	198+00	**Min.**	0.00	-11.68	-1.78	-2.07	-1.78	-0.15	-0.95
						Avg.	3.78	-1.35	-0.58	-0.25	-0.54	0.70	12.19
						Inches	0.15	-0.05	-0.02	-0.01	-0.02	0.03	0.48
						Max.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.5		128	355+00	359+00	**Min.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		HMA S. R.				**Inches**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Max.	1.78	2.54	3.05	4.88	3.36	1.72	1.92
			130	360+00	364+00	**Min.**	-2.79	-3.30	-2.03	-3.92	-2.63	-3.31	-2.31
						Avg.	-0.05	-0.46	0.66	-0.51	0.14	-0.74	-0.21
						Inches	0.00	-0.02	0.03	-0.02	0.01	-0.03	-0.01
						Max.	5.84	1.27	5.59	0.00	2.74	0.69	0.00
		Patch	189	500+50	506+60	**Min.**	-1.78	-2.54	-2.03	0.00	-19.85	-4.46	0.00
						Avg.	1.73	-0.28	1.12	0.00	-2.75	-1.20	0.00
						Inches	0.07	-0.01	0.04	0.00	-0.11	-0.05	0.00
						Max.	2.79	15.24	2.03	1.15	1.37	3.01	11.84
			65	199+00	203+00	**Min.**	-1.78	-0.25	-4.06	-1.98	-3.99	-0.21	9.43
						Avg.	0.64	2.46	-0.89	-0.23	-0.44	0.59	10.76
		Scarify				**Inches**	0.03	0.10	-0.03	-0.01	-0.02	0.02	0.42
						Max.	1.52	1.27	1.02	0.09	1.54	1.37	11.88
			67	204+00	208+00	**Min.**	-0.76	-2.79	-3.05	-3.44	-3.13	-1.30	8.84
						Avg.	0.48	-0.08	-0.76	-1.22	-0.57	0.32	10.52
						Inches	0.02	0.00	-0.03	-0.05	-0.02	0.01	0.41
						Max.	21.59	2.54	3.81	1.97	2.01	0.65	2.59
			132	365+00	369+00	**Min.**	-3.81	-20.07	-3.05	-4.06	-3.44	-3.76	-4.38
						Avg.	1.60	-2.79	-0.53	-0.90	-0.84	-1.31	-0.90
						Inches	0.06	-0.11	-0.02	-0.04	-0.03	-0.05	-0.04
						Max.	1.52	2.29	4.06	2.48	2.07	2.18	1.21
	6.0	HMA S. R.	134	370+00	374+00	**Min.**	-1.02	-2.54	-3.05	-3.37	-1.65	-2.26	-1.95
						Avg.	-0.03	0.03	-0.05	-0.03	0.07	-0.85	-0.70
						Inches	0.00	0.00	0.00	0.00	0.00	-0.03	-0.03
						Max.	5.08	2.79	4.57	0.00	3.10	1.59	23.86
		Patch	191	507+60	513+70	**Min.**	-2.03	-2.54	-2.79	0.00	-4.63	-3.40	-17.02
						Avg.	1.83	0.53	1.04	0.00	-0.02	-1.02	0.61
						Inches	0.07	0.02	0.04	0.00	0.00	-0.04	0.02
						Max.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Remove	59	183+75	186+75	**Min.**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Avg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Inches	0.00	0.00	0.00	0.00	0.00	0.00	0.00

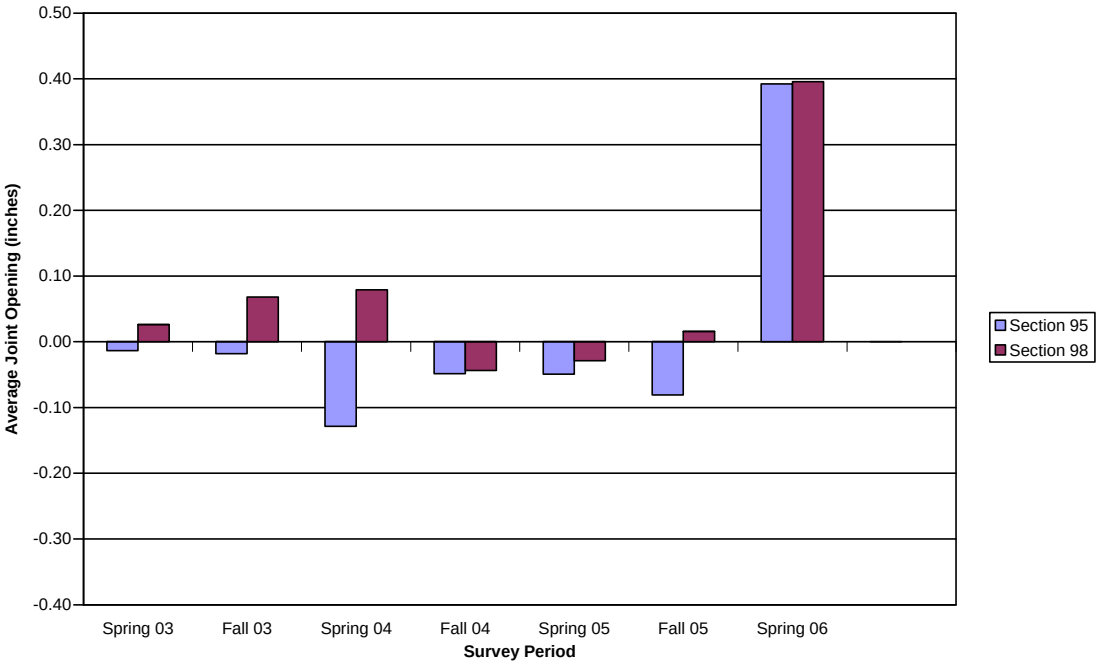

Figure C.1. Joint opening, 3.5” depth, HMA S. R., no fibers, 4.5’ panel

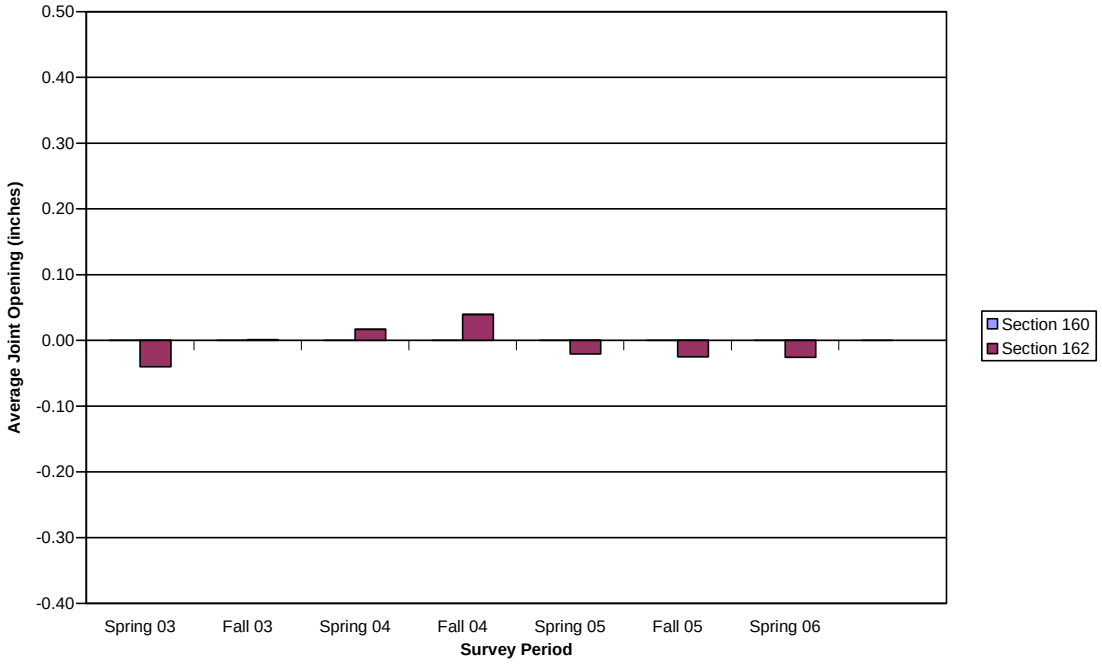

Figure C.2. Joint opening, 3.5” depth, patch, no fibers, 4.5’ panel

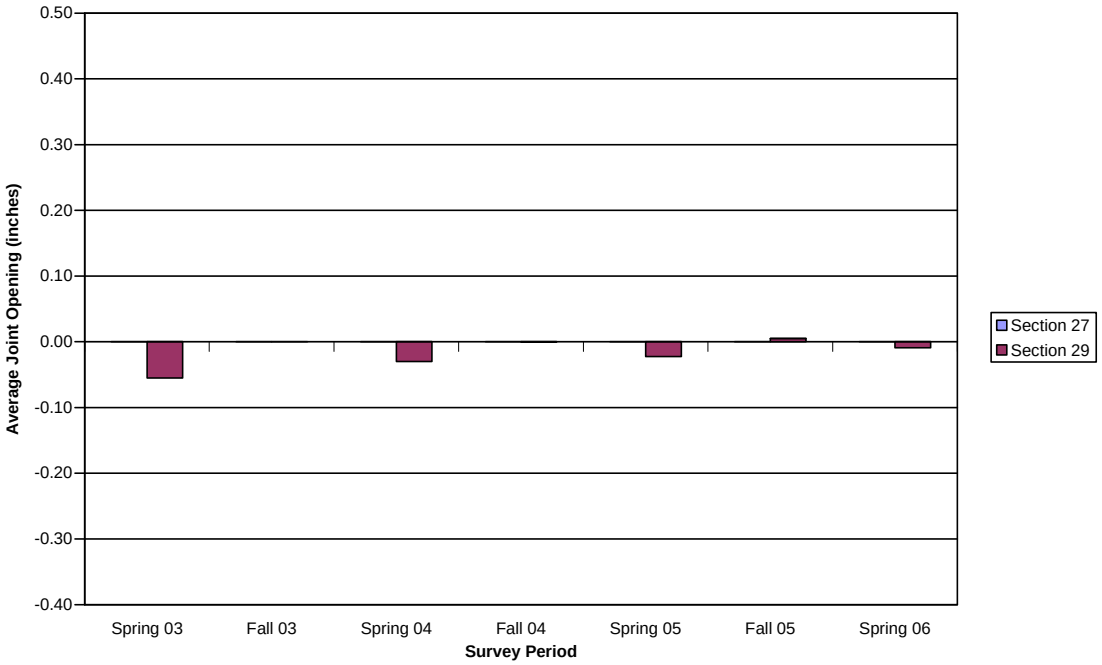

Figure C.3. Joint opening, 3.5” depth, scarify, no fibers, 6’ panel

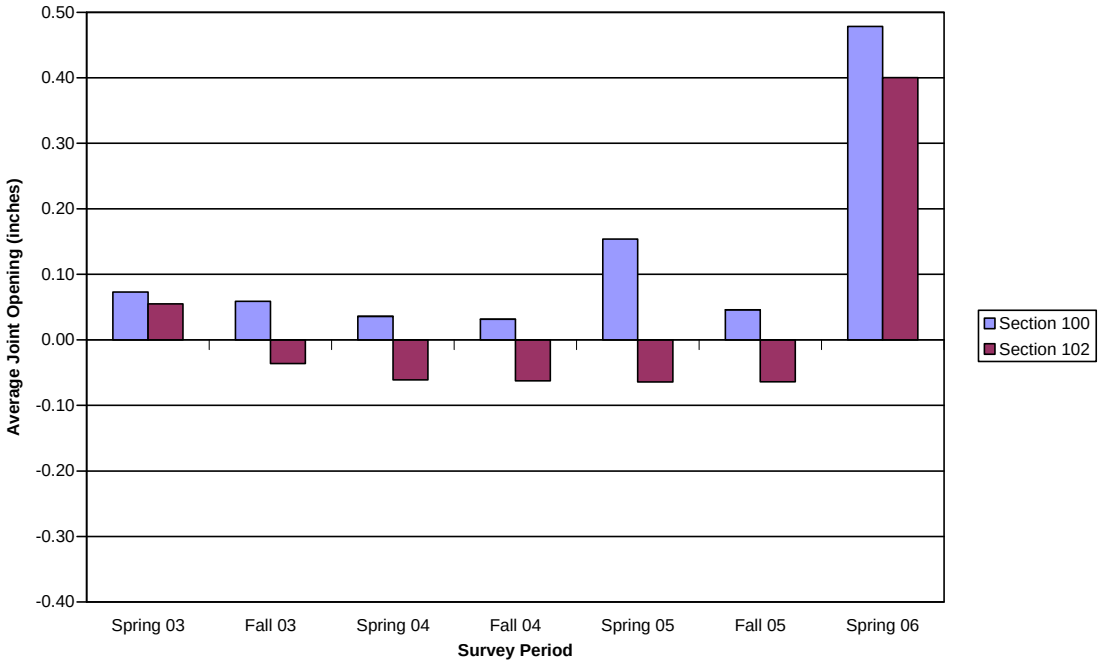

Figure C.4. Joint opening, 3.5” depth, HMA S. R., no fibers, 6’ panel

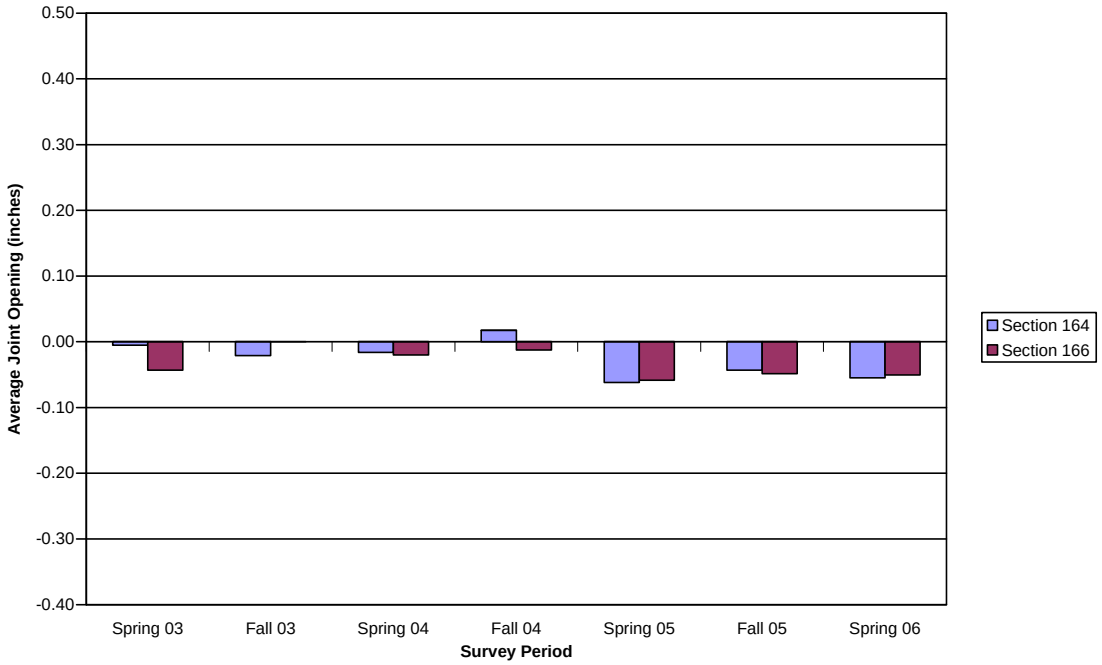

Figure C.5. Joint opening, 3.5” depth, patch, no fibers, 6’ panel

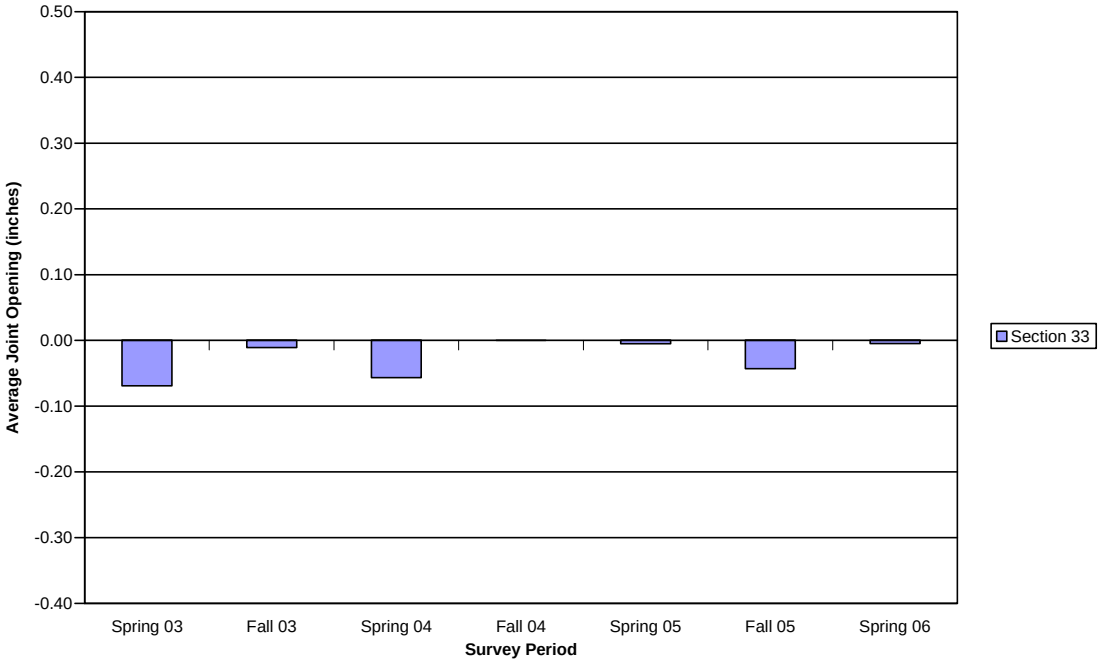

Figure C.6. Joint opening, 3.5” depth, scarify, fiber A, 4.5’ panel

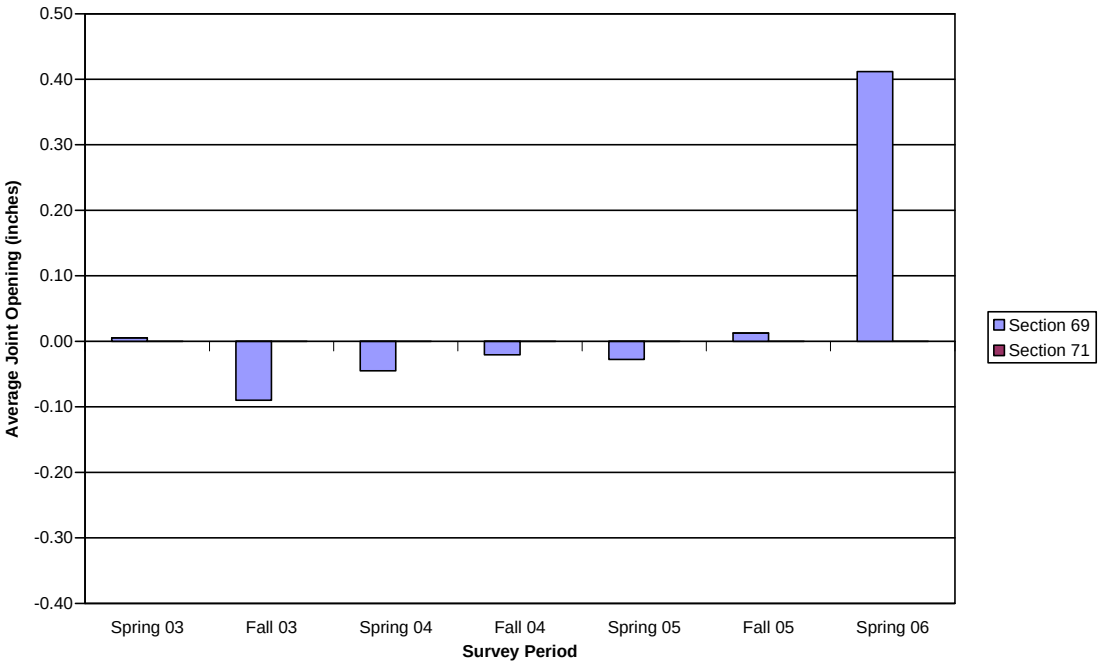

Figure C.7. Joint opening, 3.5” depth, HMA S. R., fiber A, 4.5’ panel

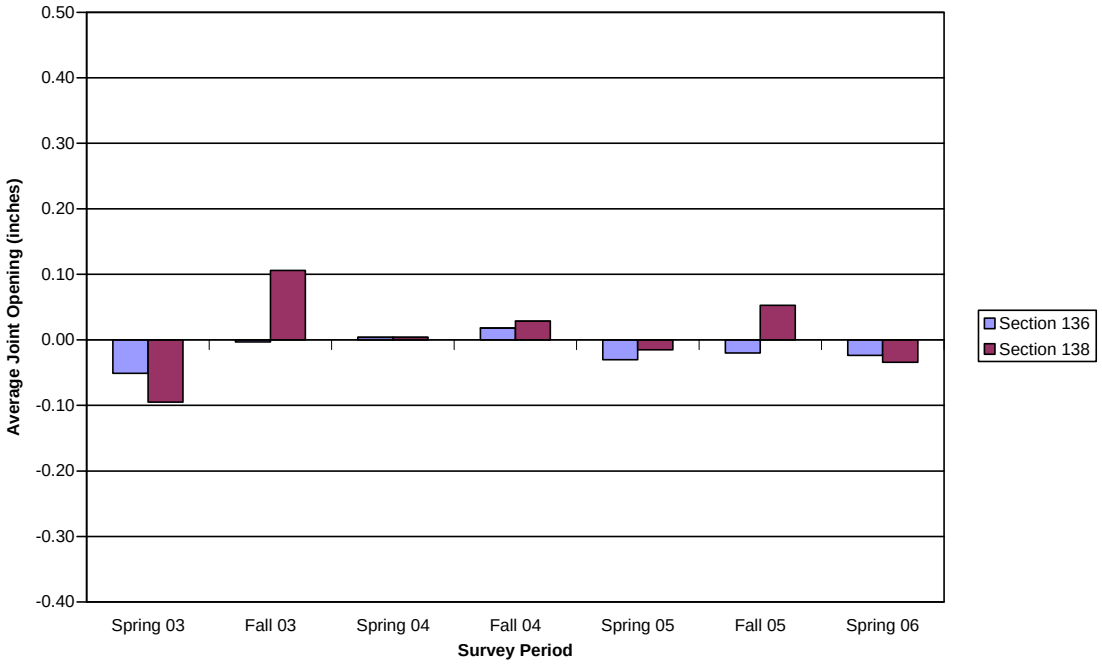

Figure C.8. Joint opening, 3.5” depth, patch, fiber A, 4.5’ panel

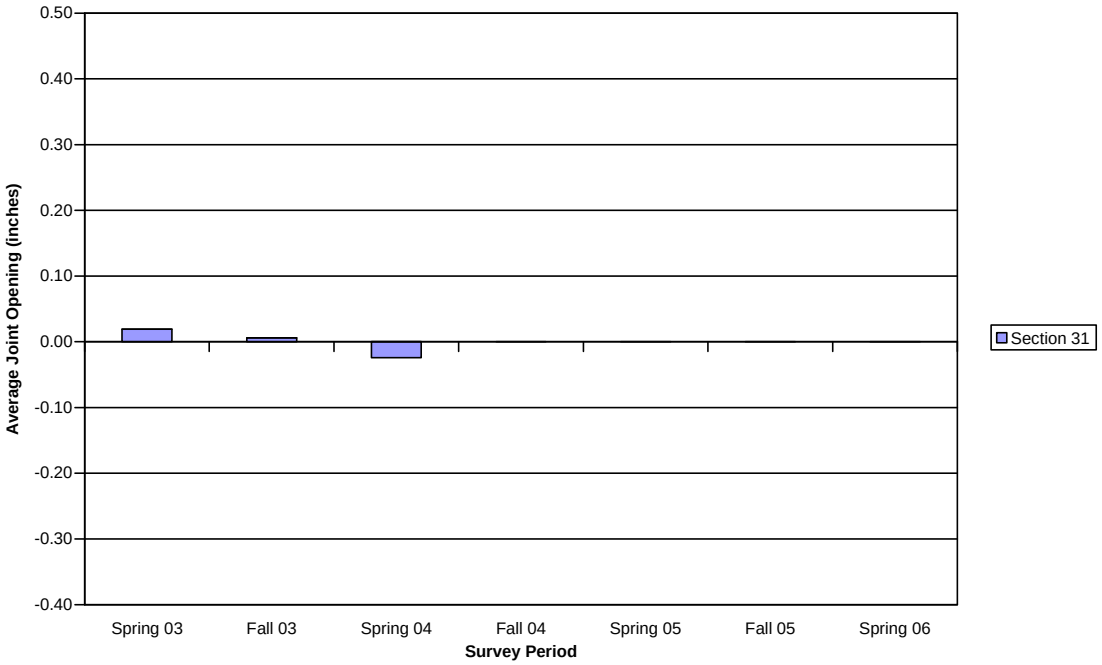

Figure C.9. Joint opening, 3.5” depth, scarify, fiber A, 6’ panel

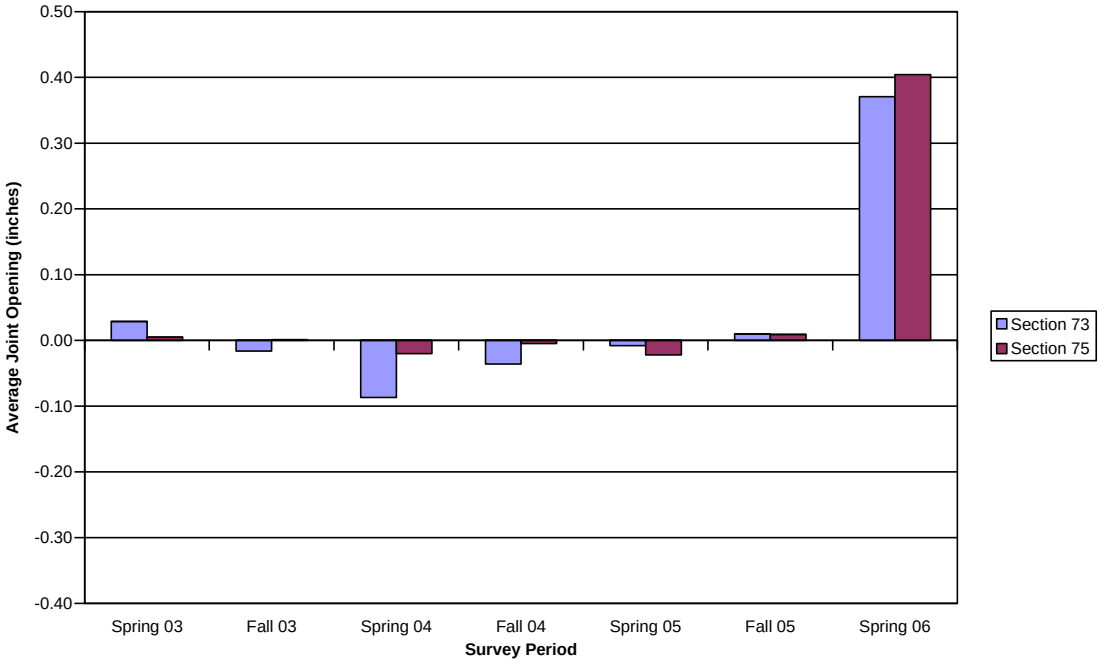

Figure C.10. Joint opening, 3.5” depth, HMA S. R., fiber A, 6’ panel

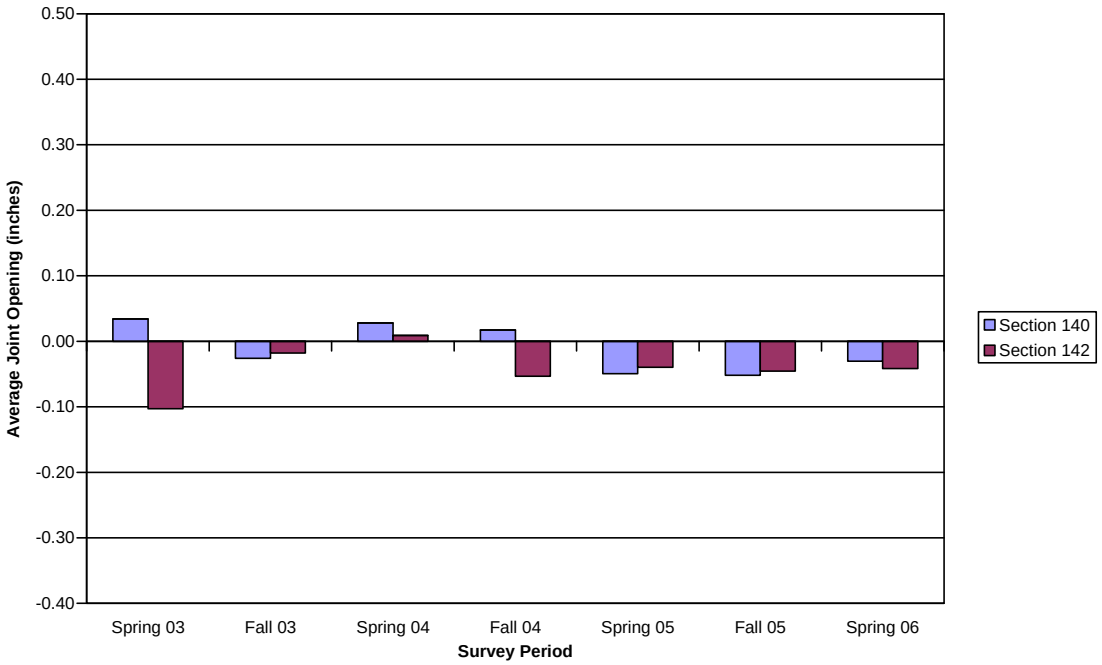

Figure C.11. Joint opening, 3.5” depth, patch, fiber A, 6’ panel

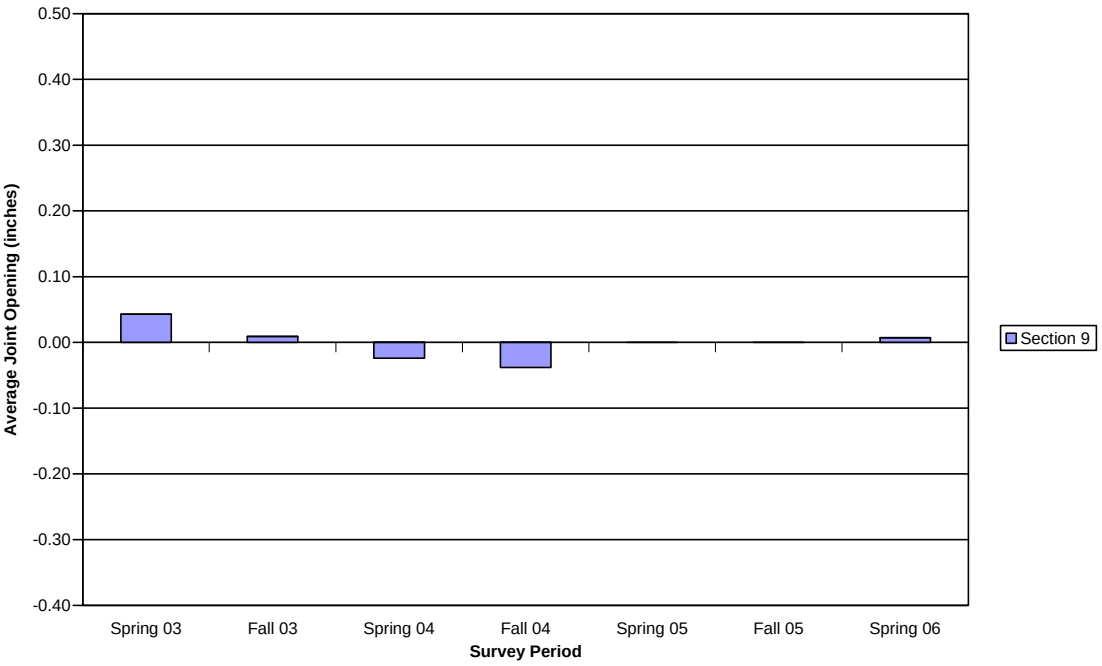

Figure C.12. Joint opening, 3.5” depth, scarify, fiber B, 4.5’ panel

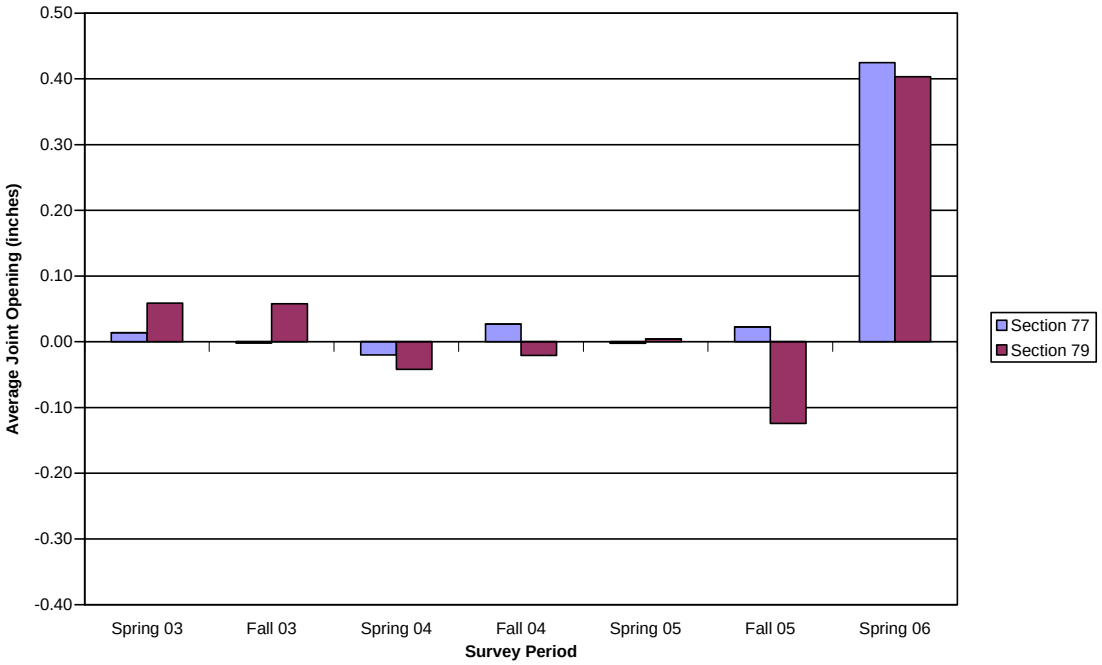

Figure C.13. Joint opening, 3.5” depth, HMA S. R., fiber B, 4.5’ panel

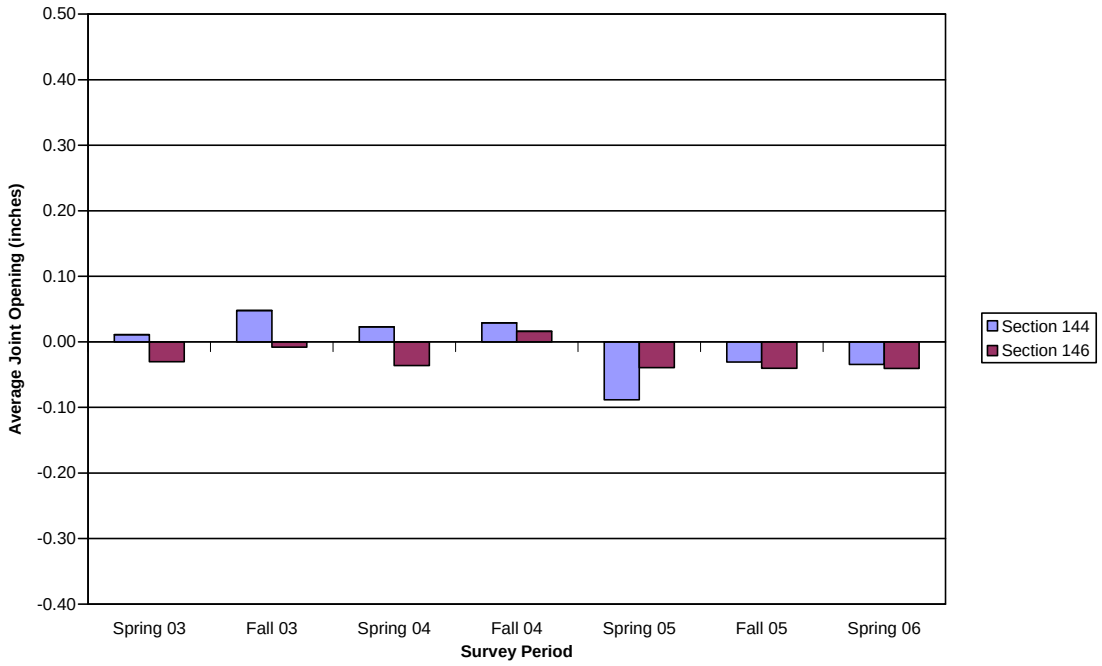

Figure C.14. Joint opening, 3.5” depth, patch, fiber B, 4.5’ panel

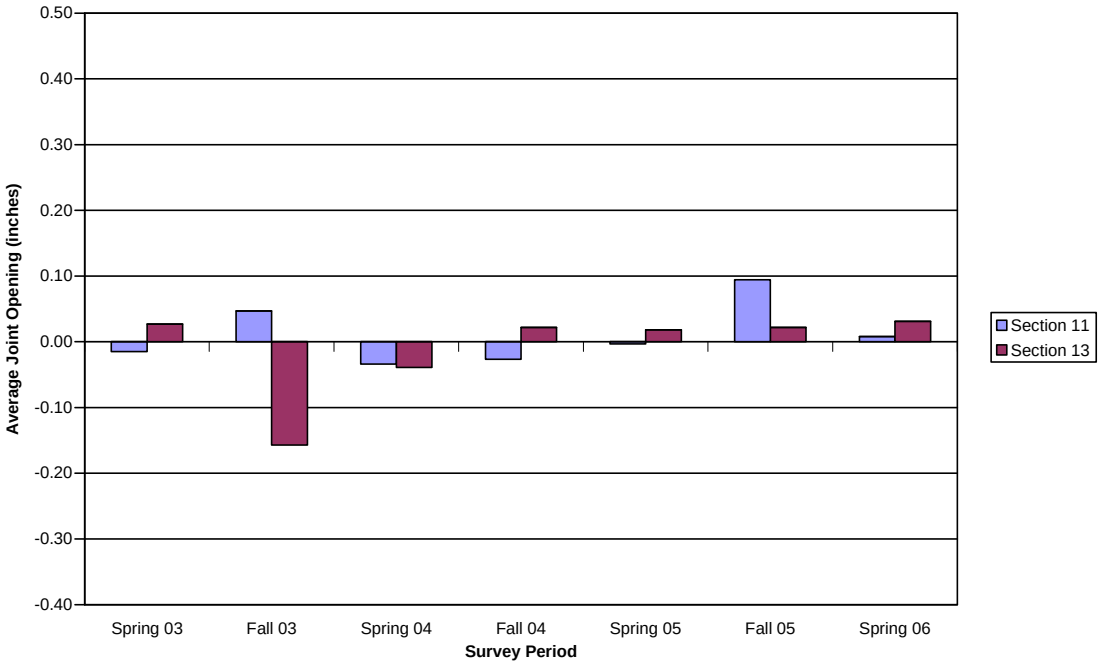

Figure C.15. Joint opening, 3.5” depth, scarify, fiber B, 6’ panel

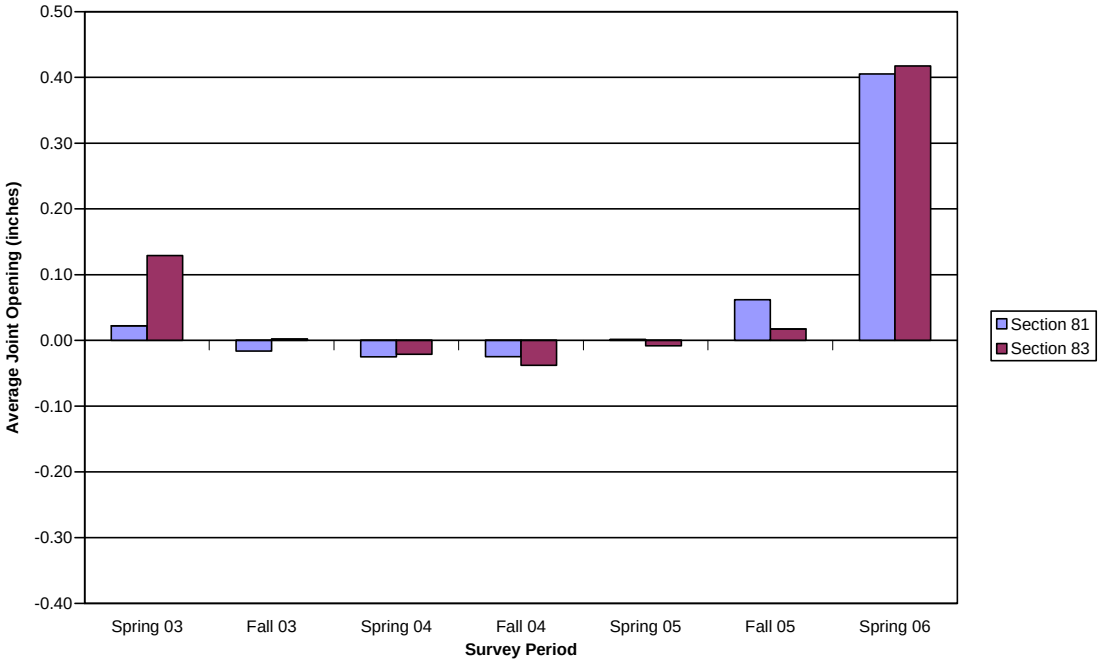

Figure C.16. Joint opening, 3.5” depth, HMA S. R., fiber B, 6’ panel

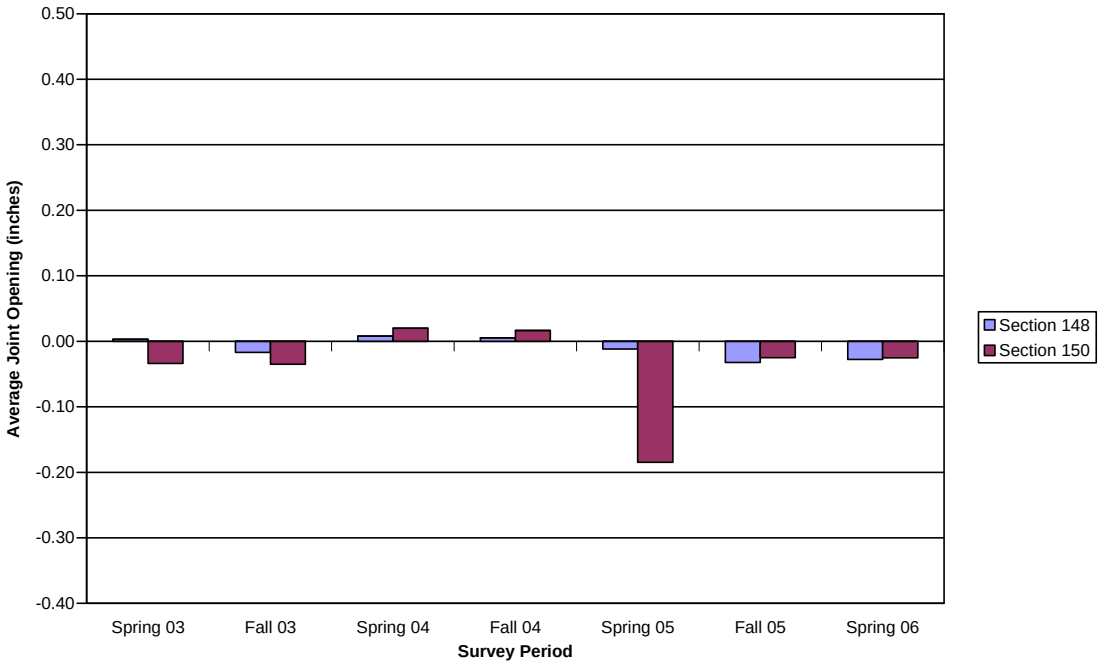

Figure C.17. Joint opening, 3.5” depth, patch, fiber B, 6’ panel

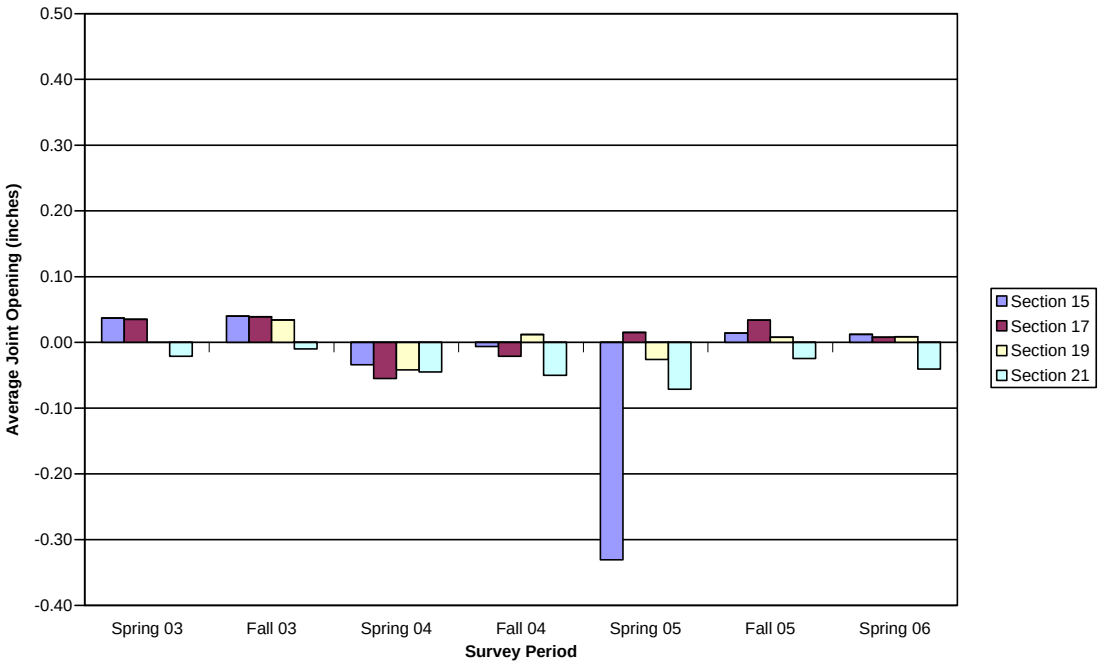

Figure C.18. Joint opening, 3.5” depth, scarify, fiber C, 6’ panel

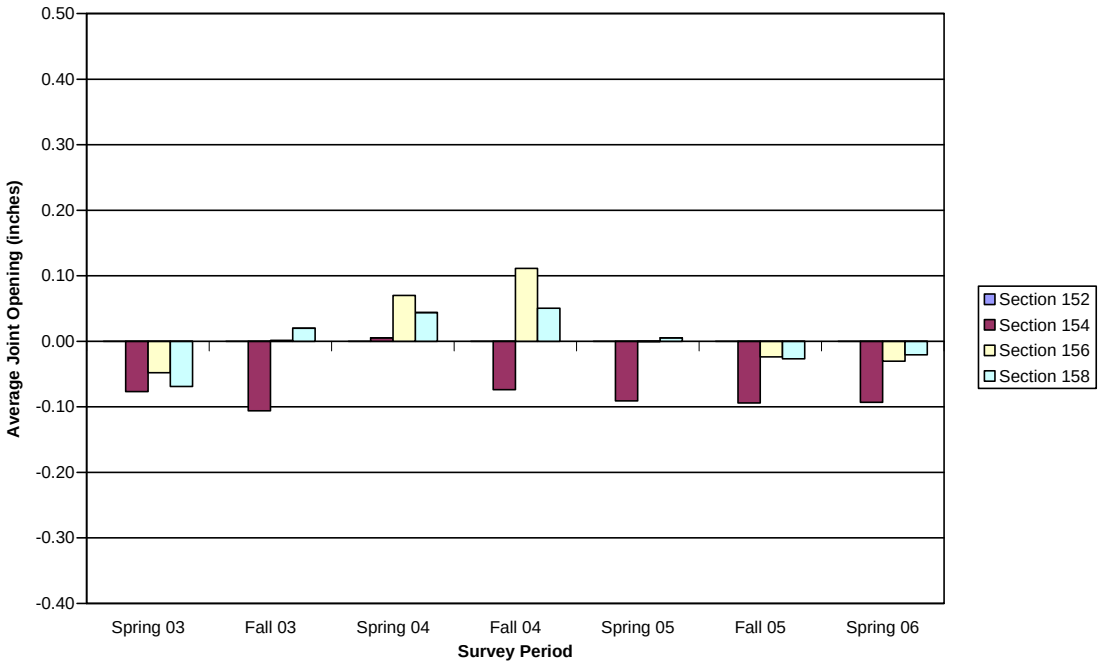

Figure C.19. Joint opening, 3.5” depth, patch, fiber C, 6’ panel

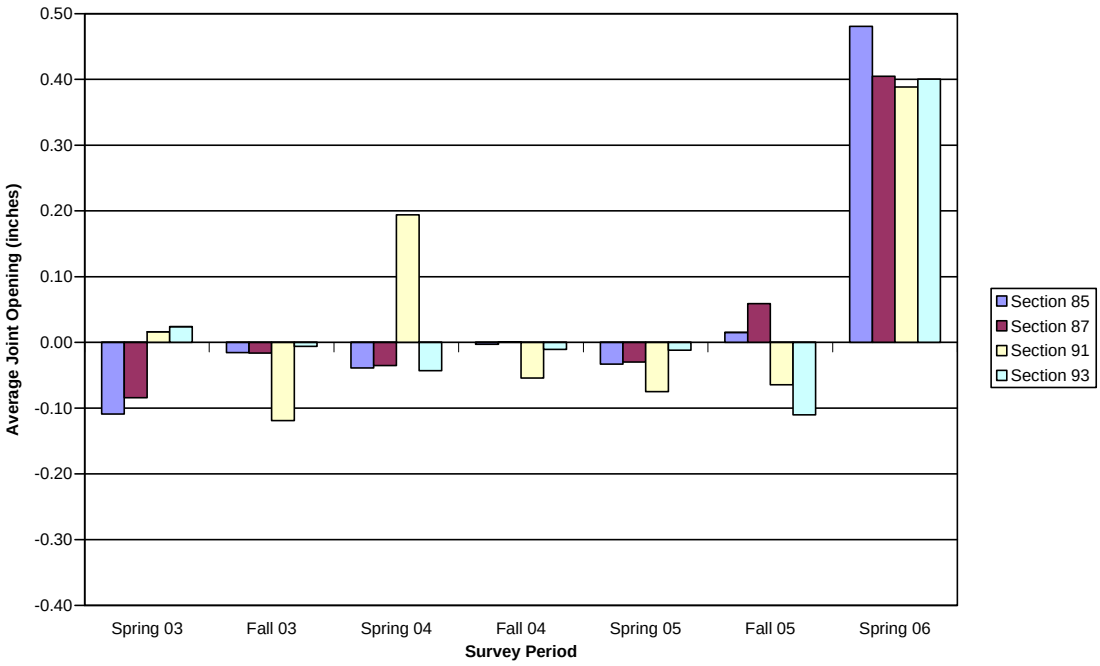

Figure C.20. Joint opening, 3.5” depth, HMA S. R., fiber C, 9’ panel

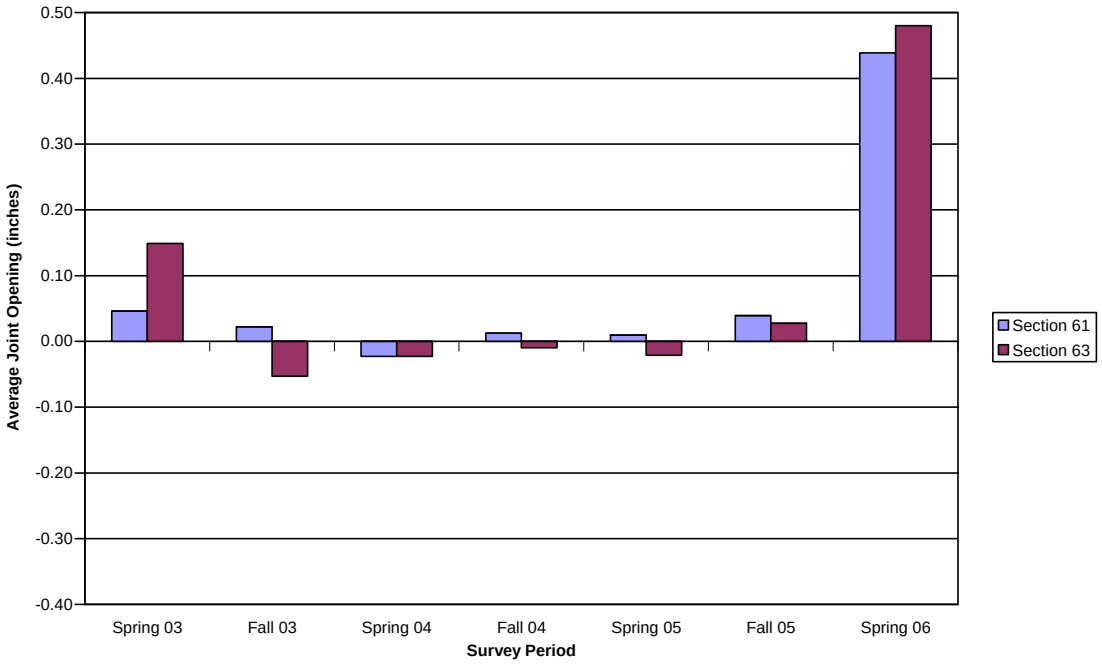

Figure C.21. Joint opening, 4.5” depth, scarify, no fibers, 4.5’ panel

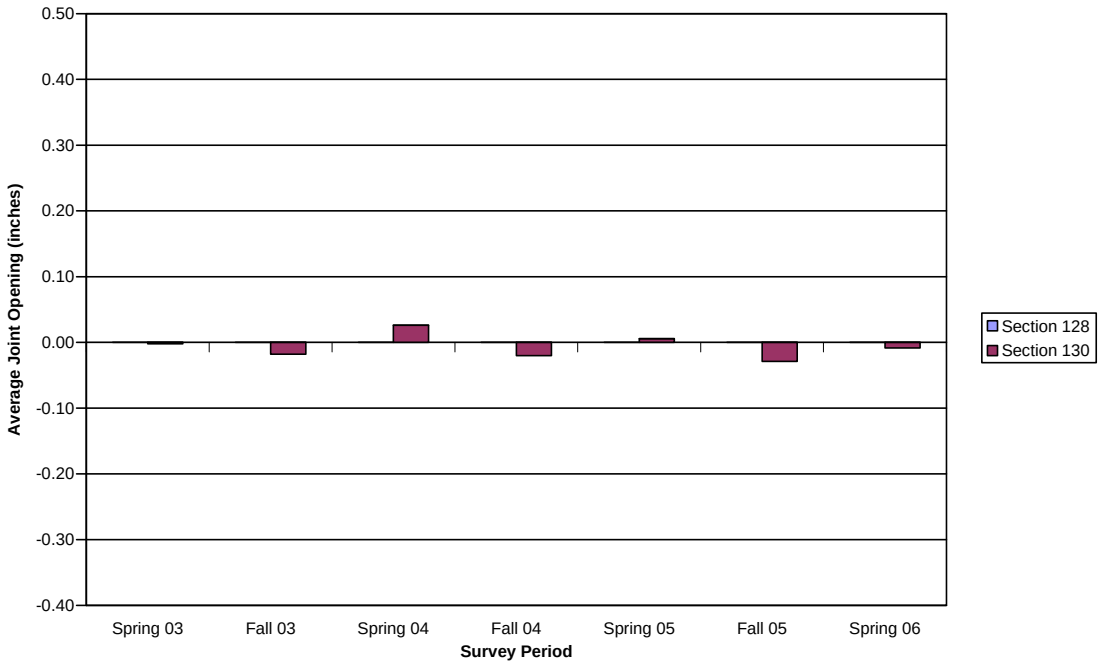

Figure C.22. Joint opening, 4.5” depth, HMA S. R., no fibers, 4.5’ panel

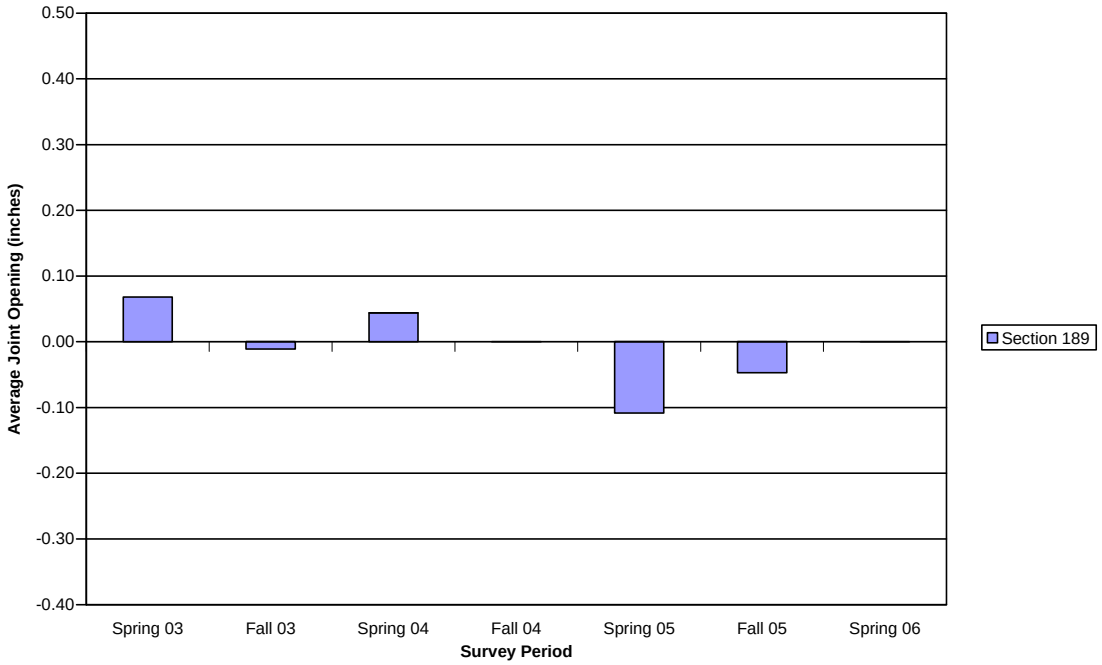

Figure C.23. Joint opening, 4.5” depth, patch, no fibers, 4.5’ panel

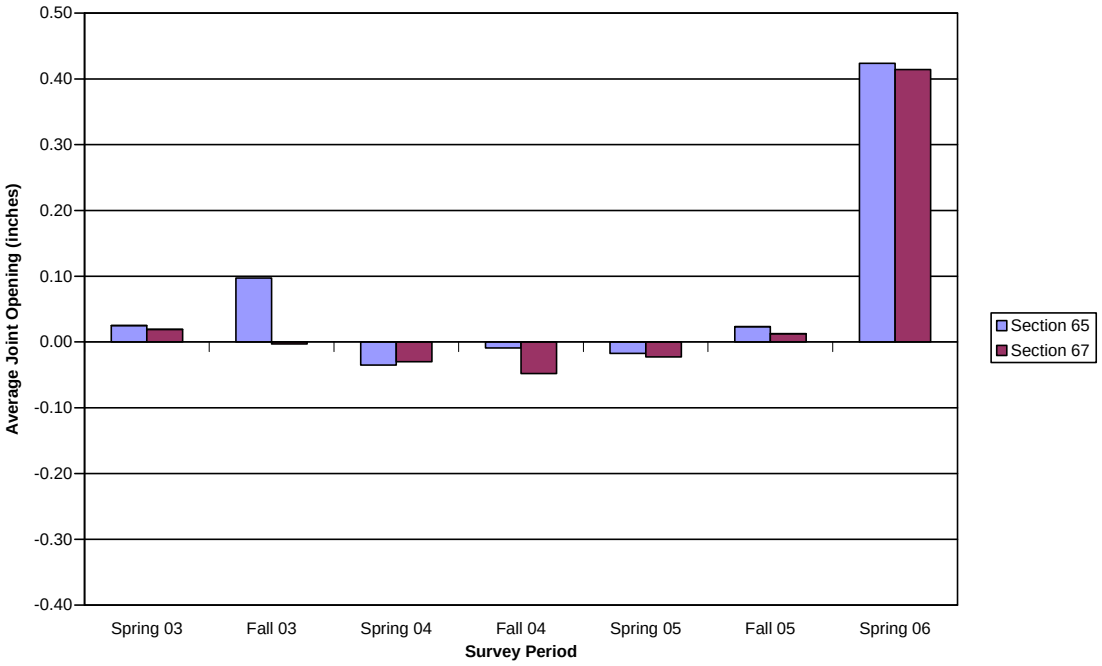

Figure C.24. Joint opening, 4.5” depth, scarify, no fibers, 6’ panel

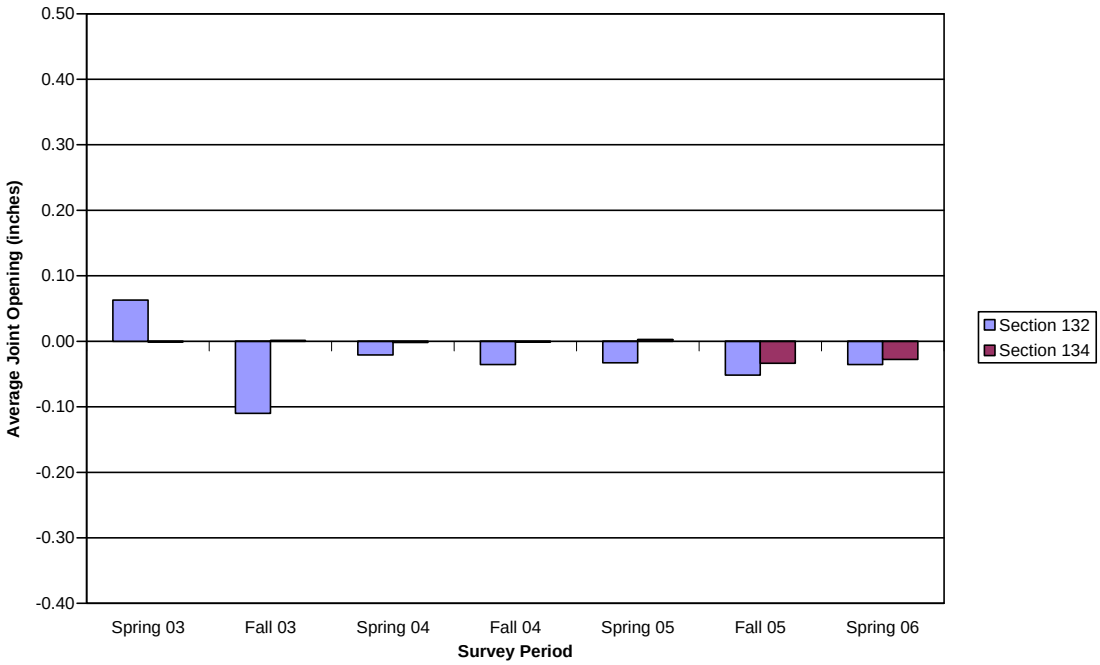

Figure C.25. Joint opening, 4.5” depth, HMA S. R., no fibers, 6’ panel

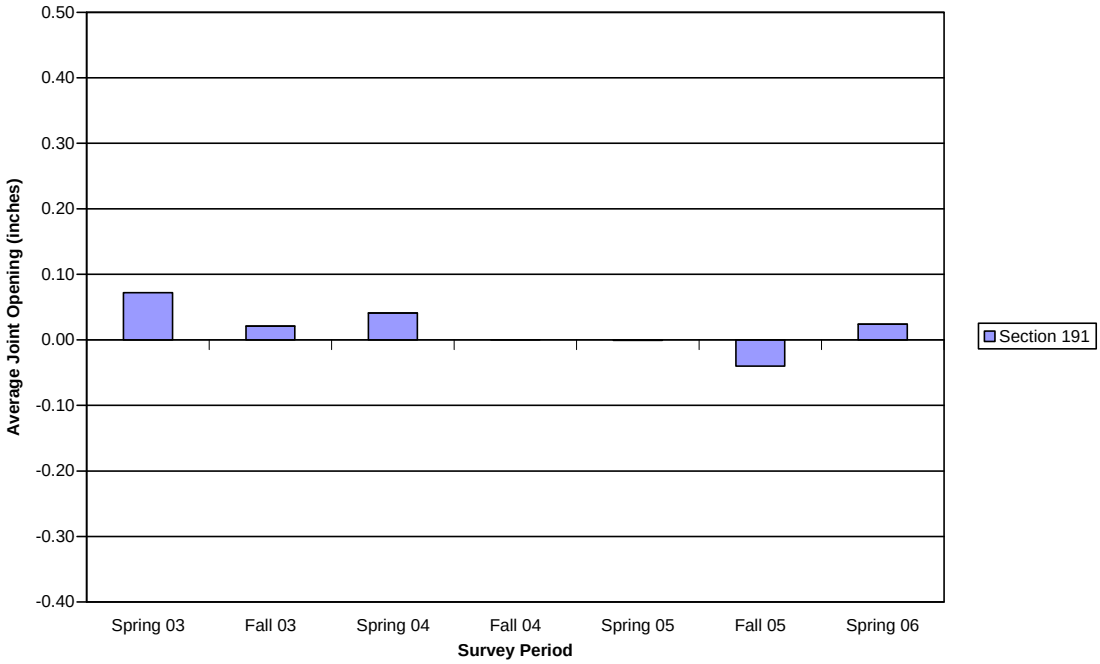

Figure C.26. Joint opening, 4.5” depth, patch, no fibers, 6’ panel

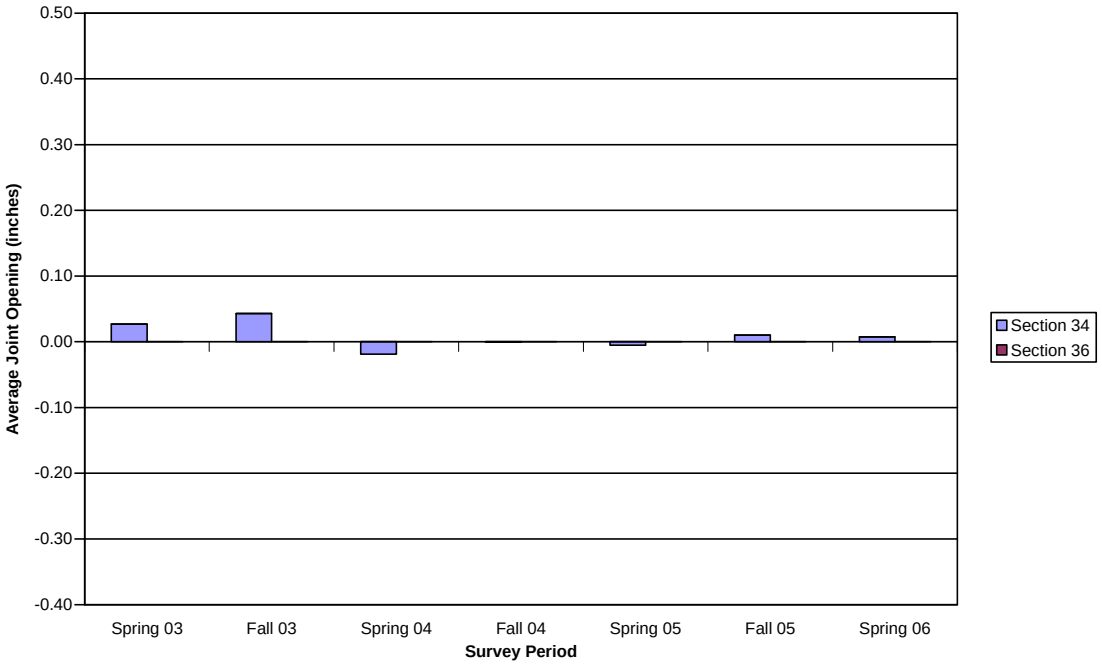

Figure C.27. Joint opening, 4.5” depth, scarify, fiber A, 4.5’ panel

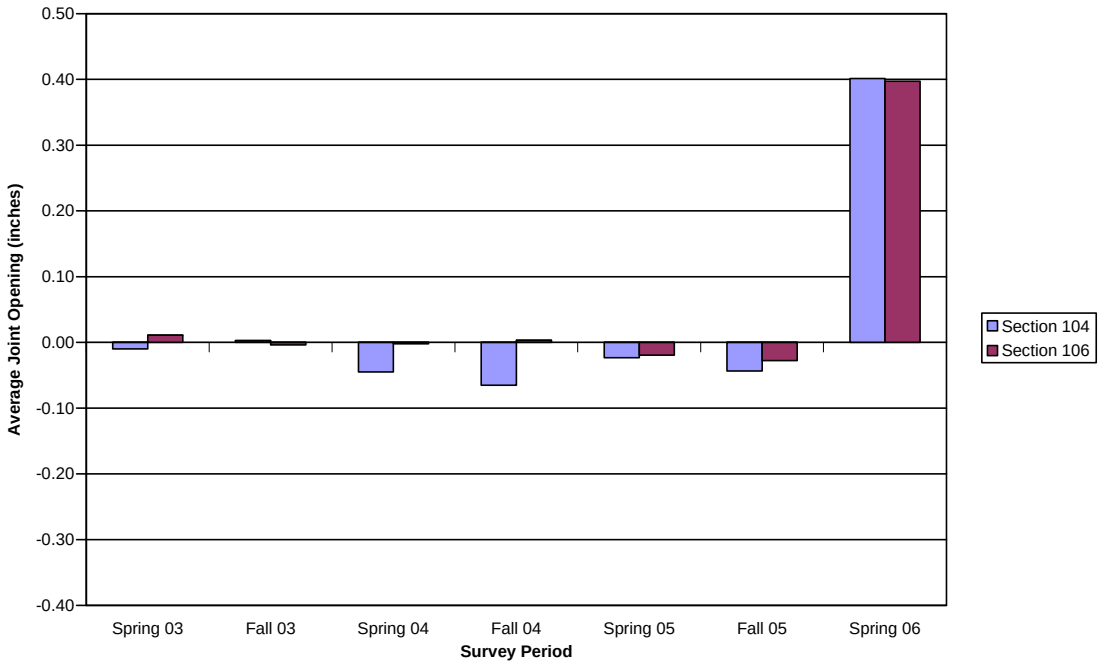

Figure C.28. Joint opening, 4.5” depth, HMA S. R., fiber A, 4.5’ panel

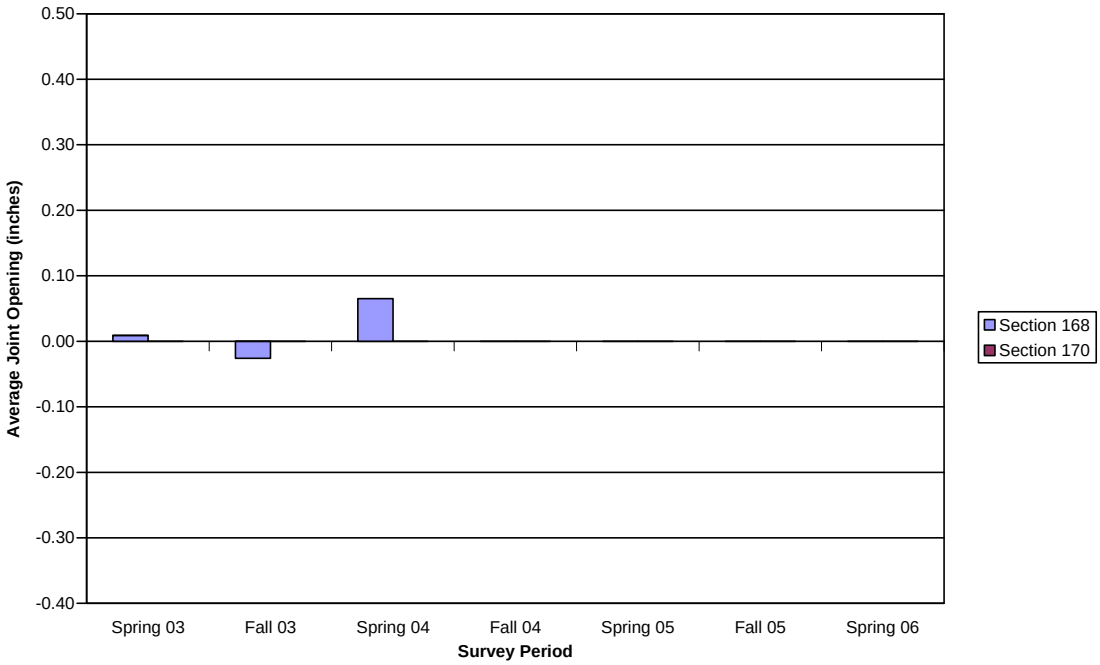

Figure C.29. Joint opening, 4.5” depth, patch, fiber A, 4.5’ panel

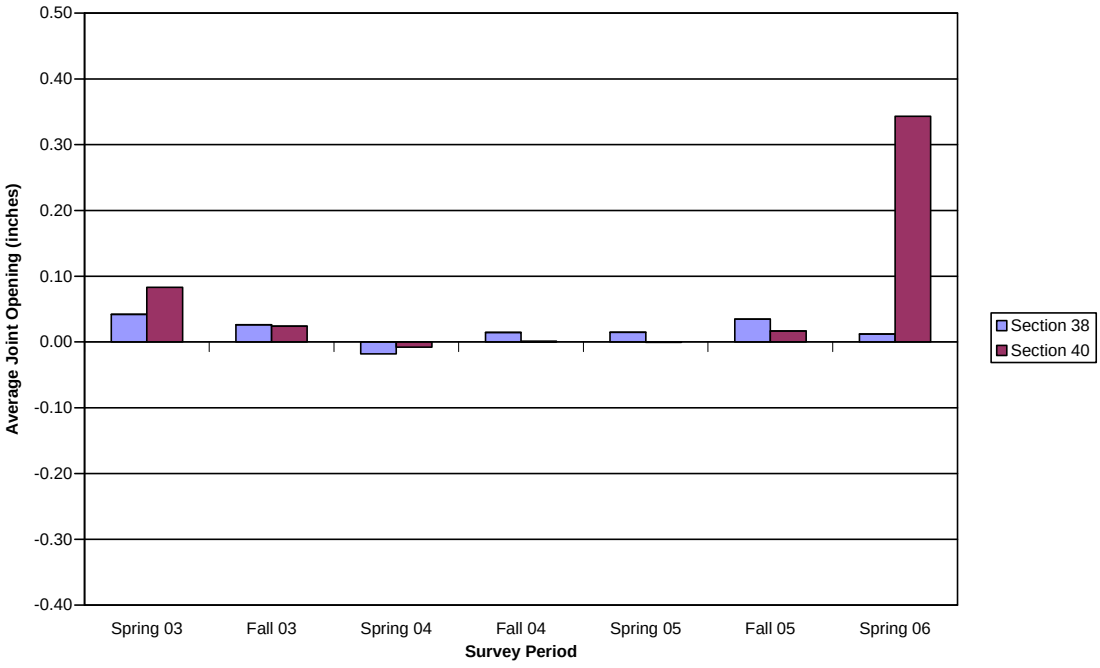

Figure C.30. Joint opening, 4.5” depth, scarify, fiber A, 6’ panel

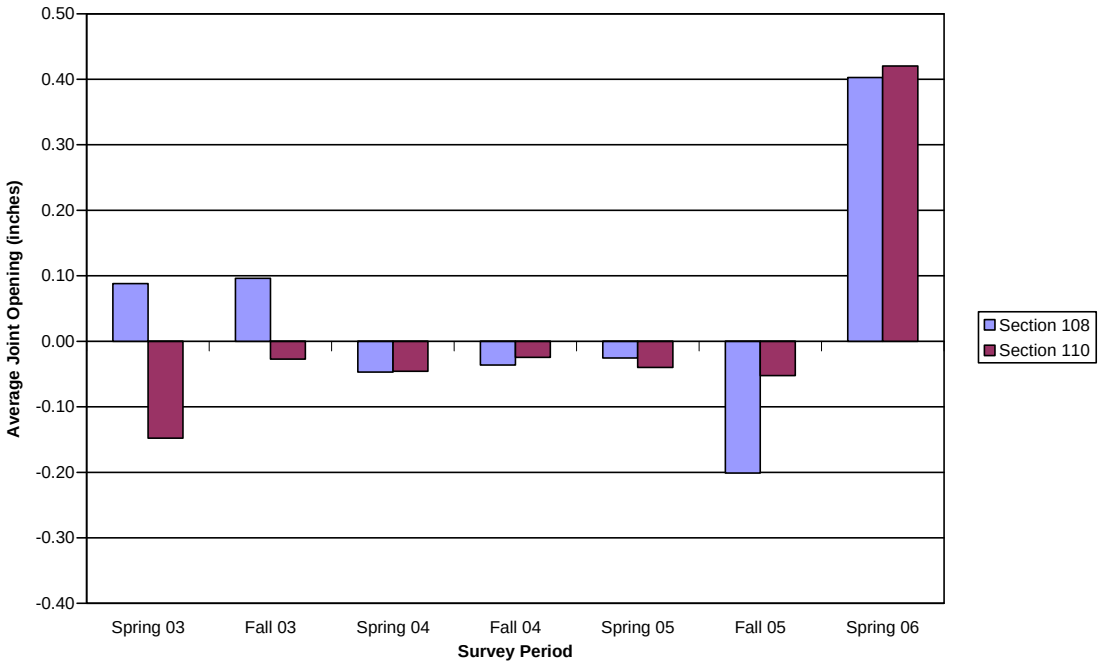

Figure C.31. Joint opening, 4.5” depth, HMA S. R., fiber A, 6’ panel

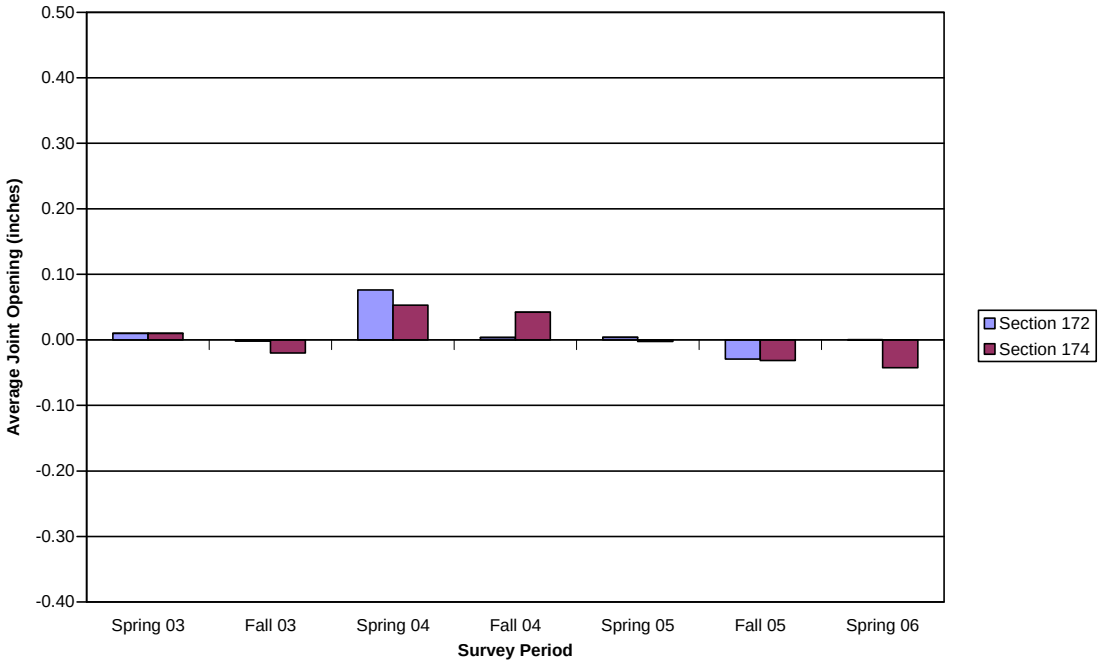

Figure C.32. Joint opening, 4.5” depth, patch, fiber A, 6’ panel

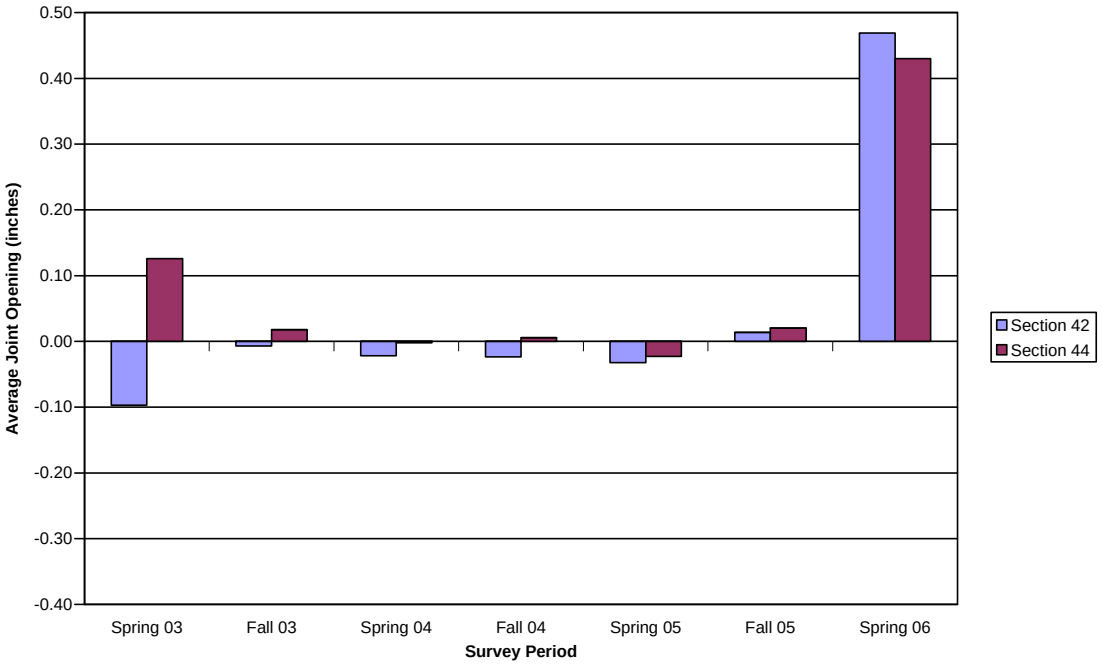

Figure C.33. Joint opening, 4.5” depth, scarify, fiber B, 4.5’ panel

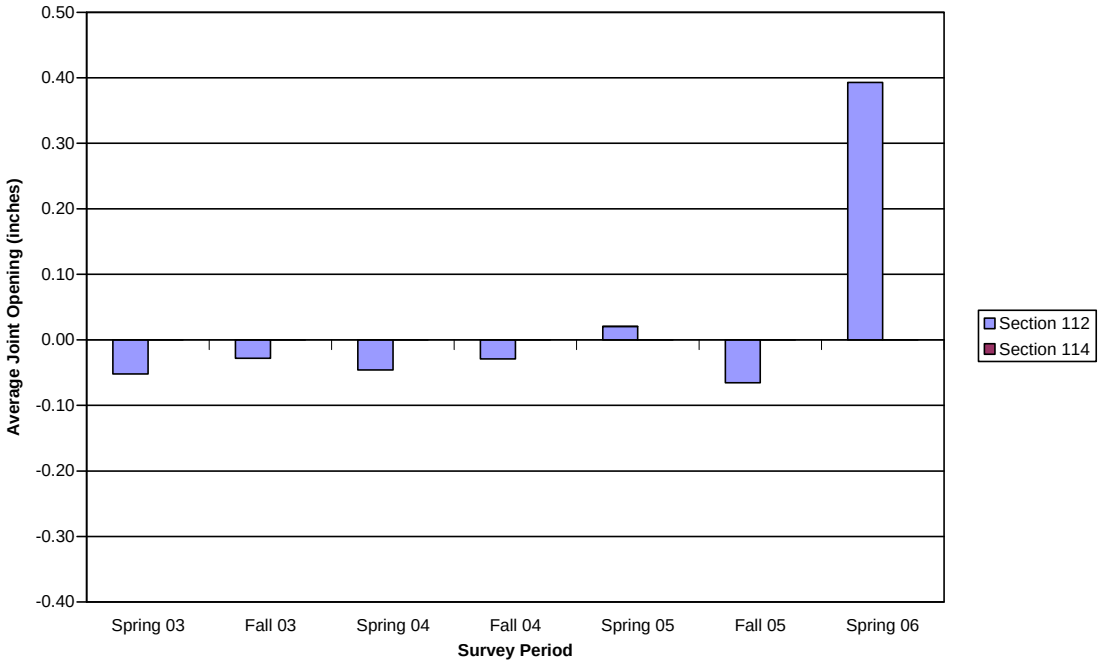

Figure C.34. Joint opening, 4.5” depth, HMA S. R., fiber B, 4.5’ panel

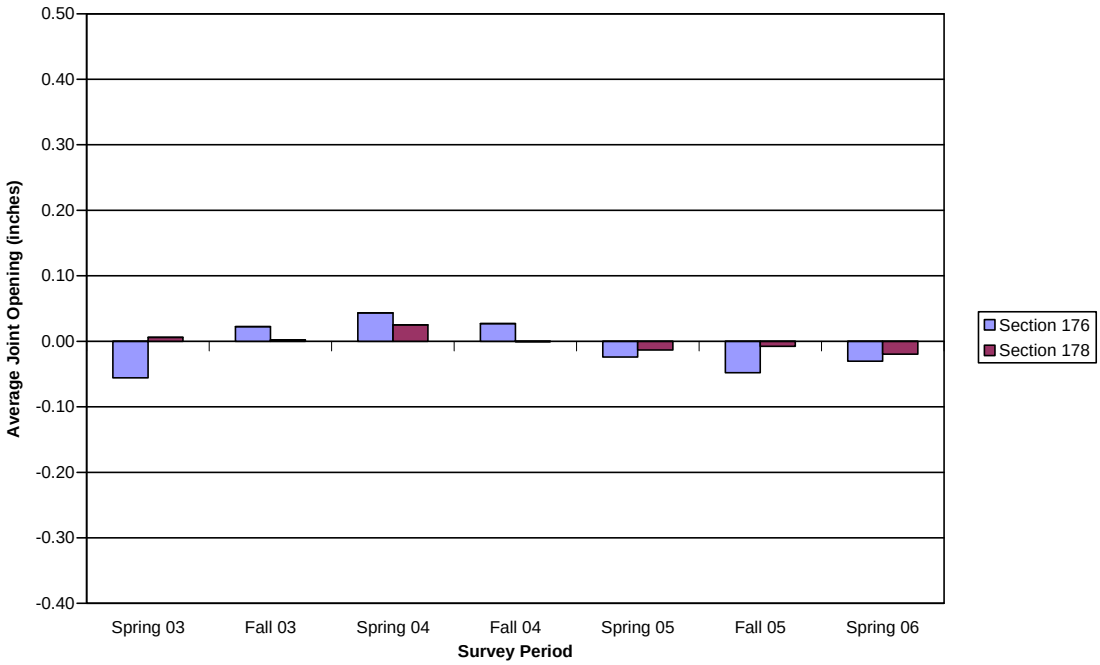

Figure C.35. Joint opening, 4.5” depth, patch, fiber B, 4.5’ panel

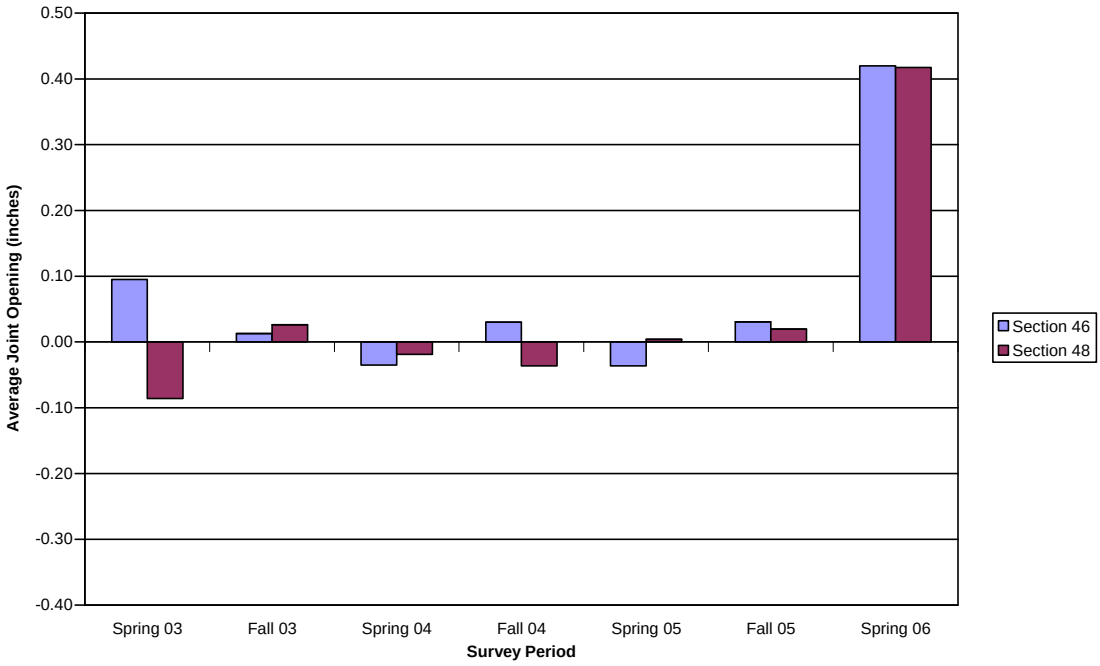

Figure C.36. Joint opening, 4.5” depth, scarify, fiber B, 6’ panel

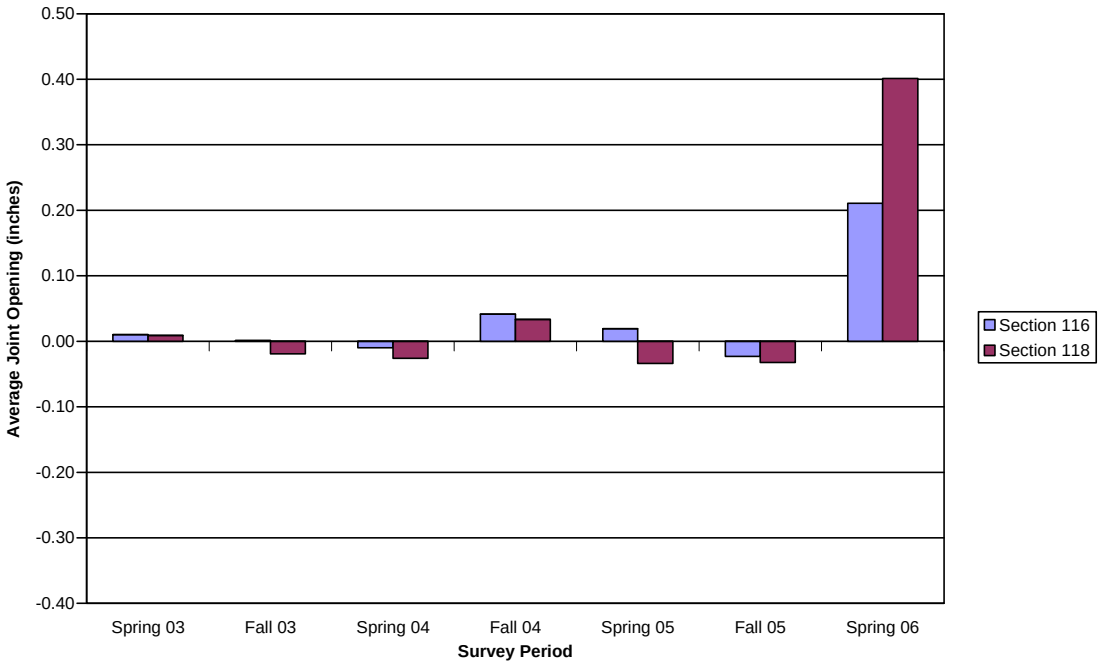

Figure C.37. Joint opening, 4.5” depth, HMA S. R., fiber B, 6’ panel

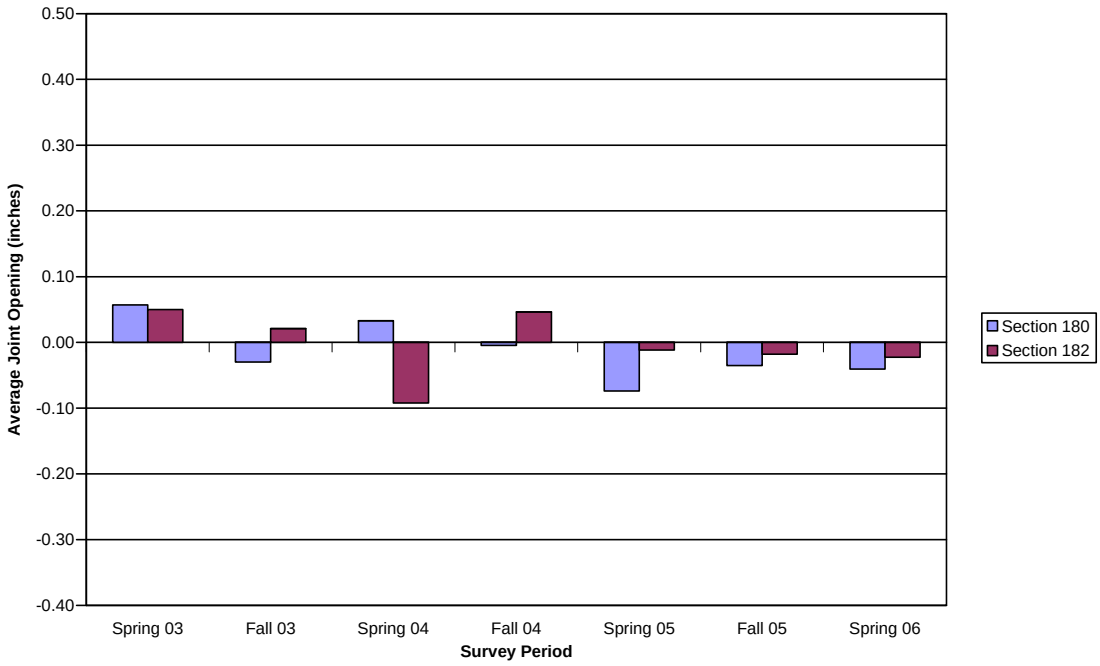

Figure C.38. Joint opening, 4.5” depth, patch, fiber B, 6’ panel

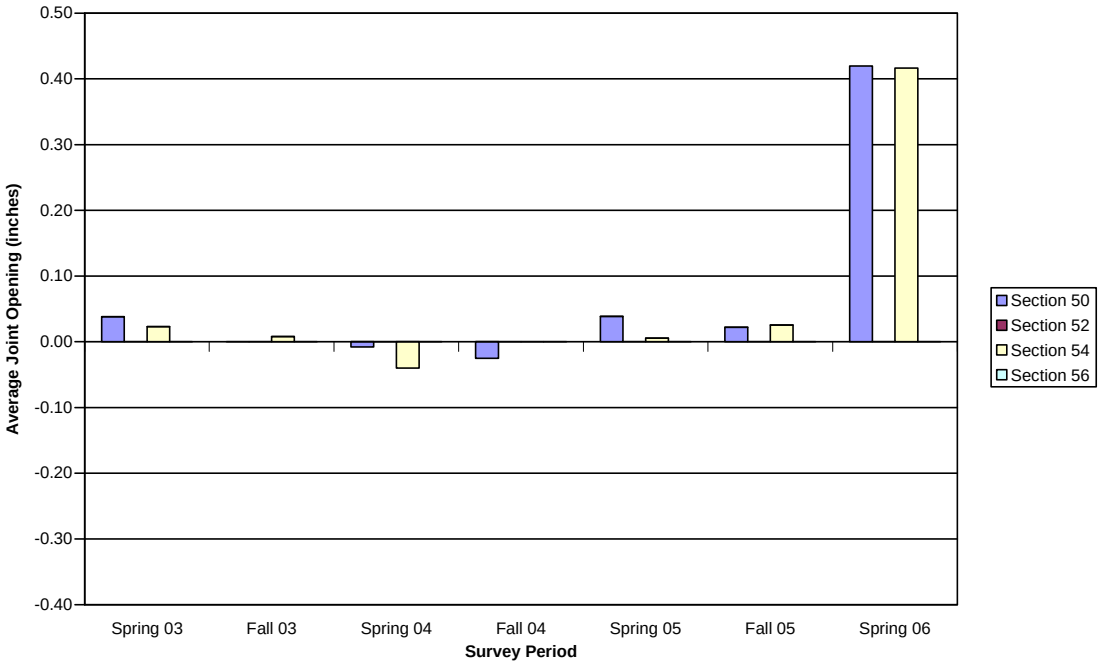

Figure C.39. Joint opening, 4.5” depth, scarify, fiber C, 9’ panel

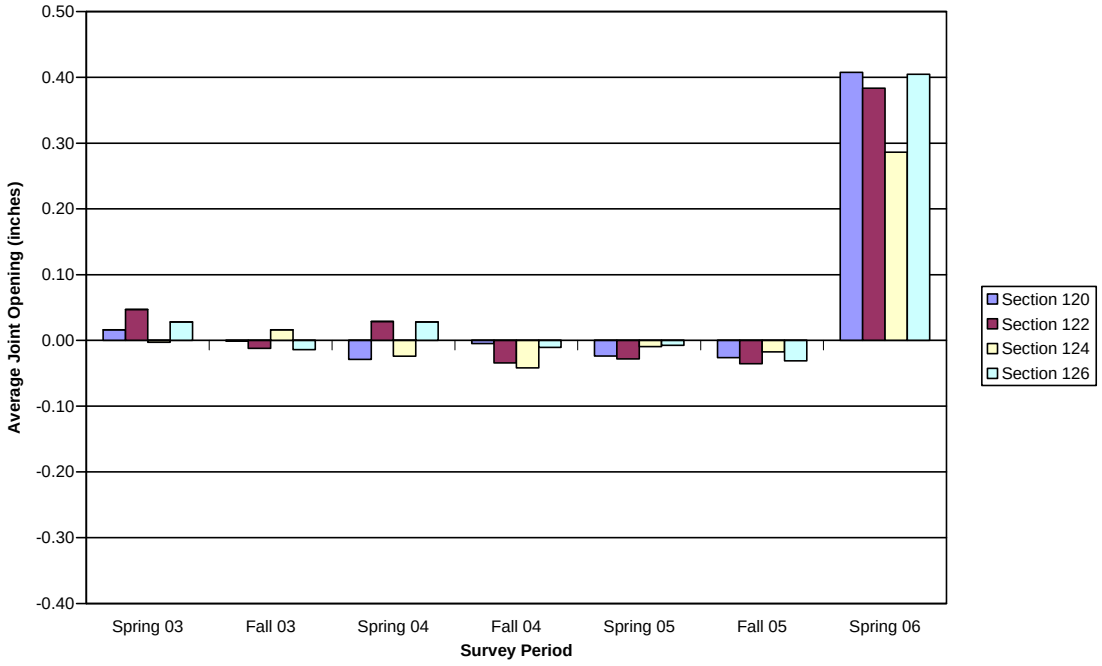

Figure C.40. Joint opening, 4.5” depth, HMA S. R., fiber C, 9’ panel

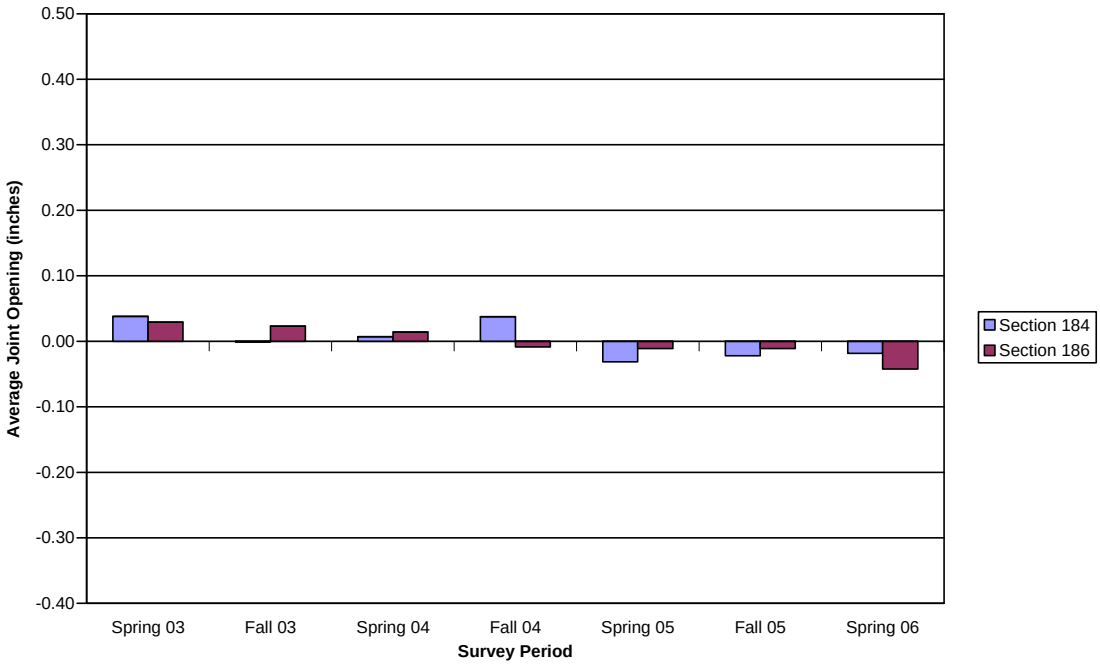

Figure C.41. Joint opening, 4.5” depth, patch, fiber C, 9’ panel

APPENDIX D: VISUAL DISTRESS SURVEY

Table D.1. Percentage of distressed slabs in overlay 3.5 in. thick

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
No	4.5	Scarify		23	87 to 91	87+15	NBL	—	—	—	—	—	—	10
						90+09	NBL	—	—	—	—	—	—	8
						90+36	NBL	—	—	—	—	—	—	1
				25	92 to 96	94+14	NBL	—	—	—	—	—	—	1
									TOTAL	**0**	**0**	**0**	**0**	**20**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**2.81%**
		HMA S. R.		95	275 to 279	—	—	—	—	—	—	—	—	—
				98	280 to 284	282+30	NBL	—	—	—	—	1	—	—
						284+00	NBL	—	—	—	—	1	—	—
									TOTAL	**0**	**0**	**2**	**0**	**0**
										0.00%	**0.00%**	**0.28%**	**0.00%**	**0.00%**
		Patch		160	435 to 439	435+23	—	—	SBL	—	—	2	—	—
						438+50	—	—	SBL	—	—	—	—	3
				162	440 to 444	443+68	NBL	—	—	—	—	—	—	4
									TOTAL	**0**	**0**	**2**	**0**	**7**
										0.00%	**0.00%**	**0.28%**	**0.00%**	**0.98%**
		Remove		89	259+75 to 263+25	262+27	NBL	—	—	—	—	—	—	4
									TOTAL	**0**	**0**	**0**	**0**	**4**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**1.13%**
	6	Scarify		27	97 to 101	97+46	NBL	—	—	—	—	—	—	2
				29	102 to 106	103+46	NBL	—	—	—	—	—	—	3
									TOTAL	**0**	**0**	**0**	**0**	**5**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**1.25%**
		HMA S. R.	Tied Joint	100	285 to 289	285+64	NBL	—	—	1	—	—	—	—
				102	290 to 294	—	—	—	—	—	—	—	—	—
									TOTAL	**1**	**0**	**0**	**0**	**0**
										0.25%	**0.00%**	**0.00%**	**0.00%**	**0.00%**
		Patch		154	420 to 424	—	—	—	—	—	—	—	—	—

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
				164	445 to 449	445+92	—	—	SBL	—	—	2	—	—
						446+06	NBL	—	—	—	—	—	—	13
						447+82	—	—	SBL	—	—	1	—	—
									SBL	—	—	—	—	10
			Tied Joint	166	450 to 454	451+48	—	CL	—	—	27	—	—	—
									TOTAL	**0**	**27**	**3**	**0**	**23**
										0.00%	**4.50%**	**0.50%**	**0.00%**	**3.83%**
A				33	113+50 to 119+50	113+68	—	—	SBL	—	—	—	—	4
						114+35	—	—	SBL	—	—	—	—	2
						114+91	—	—	SBL	—	—	—	—	1
						115+50	—	—	SBL	—	—	—	—	1
		Scarify				117+91	—	—	SBL	—	—	—	—	2
						118+59	—	—	SBL	—	—	—	—	3
									TOTAL	**0**	**0**	**0**	**0**	**13**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**3.66%**
				69	209 to 213	—	—	—	—	—	—	—	—	—
				71	214 to 218	214+55	NBL	—	—	—	—	—	—	1
	4.5	HMA S. R.				216+64	—	—	SBL	—	—	2	—	—
						218+00	NBL	—	—	—	—	—	—	18
									TOTAL	**0**	**0**	**2**	**0**	**19**
										0.00%	**0.00%**	**0.28%**	**0.00%**	**2.67%**
				136	375 to 379	375+00	—	—	SBL	—	—	—	—	5
				138	380 to 384	380+74	NBL	—	—	—	—	—	—	5
		Patch				382+18	—	—	SBL	—	—	—	—	5
						382+86	—	—	SBL	—	—	—	—	2
									TOTAL	**0**	**0**	**0**	**0**	**17**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**2.39%**
	6	Scarify	Tie Center 200’	31	107 to 113	107+00	—	—	SBL	—	—	1	—	—
									SBL					20
						107+72	—	CL	—	—	—	—	—	2
						107+76	—	—	SBL	—	—	—	—	2
						108+24	—	—	SBL	—	—	—	—	2
						108+48	NBL	—	—	—	—	—	—	1
						111+04	—	—	SBL	—	—	—	—	1

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
						111+82	—	—	SBL	—	—	—	—	1
									TOTAL	**0**	**0**	**1**	**0**	**29**
										0.00%	**0.00%**	**0.50%**	**0.00%**	**14.50%**
				73	219 to 223	219+06	—	—	SBL	—	—	4	—	—
							—	—	SBL	—	—	2	—	—
							NBL	—	—	—	—	1	—	—
						219+12	—	—	SBL	—	—	1	—	—
						219+24	—	—	SBL	—	—	2	—	—
							—	—	SBL	—	—	2	—	—
							NBL	—	—	—	—	2	—	—
		HMA S. R.				219+48	—	—	SBL	—	—	1	—	—
			Tied Joint	75	224 to 228	226+12	—	—	SBL	—	—	1	—	—
						226+24	—	—	SBL	—	—	1	—	—
						226+52	—	—	SBL	—	—	2	—	—
							NBL	—	—	—	—	1	—	—
									TOTAL	**0**	**0**	**20**	**0**	**0**
										0.00%	**0.00%**	**5.00%**	**0.00%**	**0.00%**
				140	385 to 389	387+20	NBL	—	—	—	—	—	—	9
		Patch	Tied Joint	142	390 to 394	392+24	—	—	SBL	—	—	1	—	—
									TOTAL	**0**	**0**	**1**	**0**	**9**
										0.00%	**0.00%**	**0.25%**	**0.00%**	**2.25%**
B	4.5			9	52 to 56	54+27	NBL	—	—	—	—	—	—	—
		Scarify							**TOTAL**	**0**	**0**	**0**	**0**	**0**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**0.00%**
				77	229 to 233	—	—	—	—	—	—	—	—	—
				79	234 to 238	234+30	—	—	SBL	—	—	1	—	—
							NBL	—	—	—	—	1	—	—
		HMA S. R.	Tied Joint	114	320 to 324	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**2**	**0**	**0**
										0.00%	**0.00%**	**0.19%**	**0.00%**	**0.00%**
		Patch		144	395 to 399	397+50	NBL	—	—	—	—	—	—	2
						397+91	NBL	—	—	—	—	—	—	33

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
						398+00	—	—	SBL	—	—	—	1	—
						398+41	NBL	—	—	—	—	1	—	—
						398+50	NBL	—	—	—	—	—	4	—
				146	400 to 404	401 to 403	NBL	—	—	—	—	—	—	44
									TOTAL	**0**	**0**	**1**	**5**	**79**
										0.00%	**0.00%**	**0.14%**	**0.70%**	**11.11%**
	6			11	57 to 61	57+30	NBL	—	—	—	—	—	—	2
						57+54	NBL	—	—	—	—	—	—	2
		Scarify	Tied Joint	13	62 to 66	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**4**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**1.00%**
				81	239 to 243	—	—	—	—	—	—	—	—	—
			Tied Joint	83	244 to 248	—	—	—	—	—	—	—	—	—
				116	325 to 329	326+00	—	—	SBL	—	—	—	—	1
		HMA S. R.		118	330 to 334	331+48	—	—	SBL	—	—	—	—	1
						331+50	NBL	—	SBL	2	—	—	—	—
						331+62	NBL	—	—	—	—	—	—	43
						333+40	—	—	SBL	—	—	—	—	1
						334+36	NBL	—	—	—	—	—	—	6
							—	—	SBL	—	—	—	—	2
									TOTAL	**2**	**0**	**0**	**0**	**54**
										0.25%	**0.00%**	**0.00%**	**0.00%**	**6.75%**
		Patch		148	405 to 409	405+82	—	—	SBL	—	—	—	—	3
						406+18	NBL	—	—	—	—	—	—	5
						406+64	NBL	—	—	—	—	—	—	3
						409+00	NBL	—	—	—	—	—	—	7
						409+56	NBL	—	—	—	—	1	—	—
						419+24	NBL	—	—	—	—	—	—	6
						420+64	—	—	SBL	—	—	—	—	6
						424+24	—	—	SBL	—	—	—	—	2

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
						425+18	NBL	—	—	—	—	—	—	6
			Tied Joint	150	410 to 414	—	—	—	—	—	—	—	—	—
				152	415 to 419	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**1**	**0**	**38**
										0.00%	**0.00%**	**0.17%**	**0.00%**	**6.33%**
C				15	67 to 71	68+50	—	—	SBL	—	—	—	—	—
				17	72 to 76	75+94	—	—	SBL	—	—	—	—	4
				19	77 to 81	80+70	—	—	SBL	—	—	1	—	—
		Scarify							SBL	—	—	2	—	—
						80+76	—	—	SBL	—	—	1	—	—
						80+88	—	—	SBL	—	—	2	—	—
						80+94	—	—	SBL	—	—	1	—	—
			Tied joint	21	82 to 86	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**7**	**0**	**4**
	6									**0.00%**	**0.00%**	**0.88%**	**0.00%**	**0.50%**
			Tied Joint	156	425 to 429	426+04	NBL	—	—	—	—	—	—	—
				158	430 t0 434	430+02	—	—	SBL	—	—	1	—	—
						430+08	—	—	SBL	—	—	2	—	—
						430+24	—	—	SBL	—	—	2	—	—
							—	—	SBL	—	—	—	—	2
		Patch				430+90	—	—	SBL	—	—	—	—	7
						432+40	NBL	—	—	—	—	—	—	1
						432+76	NBL	—	—	—	—	—	—	3
						433+94	—	—	SBL	—	—	1	—	—
									TOTAL	**0**	**0**	**6**	**0**	**13**
										0.00%	**0.00%**	**1.50%**	**0.00%**	**3.25%**
	9	HMA S. R.		85	249 to 253	251+00	—	—	SBL	—	—	1	—	—
						252+18	NBL	—	—	—	—	1	—	—
						252+64	NBL	—	—	—	—	—	—	2
							—	—	SBL	—	—	3	—	—
						252+64	NBL	—	—	—	—	—	—	5
						252+82	—	—	SBL	—	—	3	—	—

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
				87	254 to 258	254+73	—	—	SBL	—	—	1	—	—
						255+27	NBL	—	—	—	—	—	—	2
						255+45	—	—	SBL	—	—	2	—	—
						256+37	NBL	—	—	—	—	—	—	7
						256+46	—	—	SBL	—	—	3	—	—
						257+36	—	—	SBL	—	—	2	—	—
						257+72	NBL	—	—	—	—	—	—	1
				91	265 to 269	267+55	NBL	—	—	—	—	—	—	2
						267+64	—	—	SBL	—	—	2	—	—
			Tied Joint	93	270 to 274	—	—	—	—	—	—	—	—	—
				120	335 to 339	335+82	—	—	SBL	—	—	—	—	4
						335+95	NBL	—	—	—	—	—	—	10
						336+10	—	—	SBL	—	—	—	—	4
						337+10	NBL	—	—	—	—	—	—	28
			Tied Joint	122	340 to 344	340+68	NBL	—	—	—	—	—	—	3
						342+91	—	—	SBL	—	—	1	—	—
						343+91	NBL	—	—	—	—	—	—	10
				124	345 to 349	345+88	—	—	SBL	—	—	—	—	2
						346+27	—	—	SBL	—	—	2	—	—
						346+54	—	—	SBL	—	—	—	—	2
						346+63	NBL	—	—	—	—	—	—	5
						346+72	—	—	SBL	—	—	—	—	1
						347+80	—	—	SBL	—	—	—	—	56
						348+73	—	—	SBL	—	—	—	—	3
				126	350 to 354	352+00	—	—	SBL	—	—	—	—	7
									TOTAL	**0**	**0**	**21**	**0**	**154**
										0.00%	**0.00%**	**2.95%**	**0.00%**	**21.66%**

Table D.2. Percentage of distressed slabs in overlay 4.5 in. thick

Test Section Characteristics					Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
No				61	189 to 193	188+32	—	—	SBL					3
		Scarify	Tied Joint	63	194 to 198	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**3**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**0.42%**
				128	355 to 359	355+00	—	—	SBL	—	—	—	—	13
						356+32	—	—	SBL	—	—	—	—	11
						357+12	—	—	SBL	—	—	—	—	14
						358+05	—	—	SBL	—	—	—	—	9
						358+90	NBL	—	—	—	—	—	—	3
	4.5	HMA S. R.	Tied Joint	130	360 to 364	360+78	—	—	SBL	—	—	—	—	38
							NBL	—	—	—	—	—	—	6
						363+46	—	—	SBL	—	—	—	—	64
							NBL	—	—	—	—	—	—	54
									TOTAL	**0**	**0**	**0**	**0**	**212**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**29.81%**
			Tie center 200'	189	500+50 to 506+50									
		Patch				501+32	—	—	SBL	—	—	—	—	2
						501+64	—	—	SBL	—	—	—	—	2
									TOTAL	**0**	**0**	**0**	**0**	**4**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**1.13%**
	6			65	199 to 203	200+92	NBL	—	—	3	—	—	—	—
		Scarify		67	204 to 208	—	—	—	—	—	—	—	—	—
									TOTAL	**3**	**0**	**0**	**0**	**0**
										0.75%	**0.00%**	**0.00%**	**0.00%**	**0.00%**
		HMA S. R.		132	365 to 369	368+52	NBL	—	—	—	—	—	—	10
				134	370 to 374	370+48	NBL	—	—	—	—	—	—	2
						371+06	NBL	—	—	—	—	—	—	2
						371+12	NBL	—	—	—	—	1	—	—
						372+00	—	—	SBL	—	—	—	—	6
						373+12	—	—	SBL	—	—	—	—	7
						373+60	—	—	SBL	—	—	—	—	7

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	**Panel Size (ft. x ft.)**	**Base Prep.**	**Tied Outer Joint**	**Test Section**	**Stations**	**Stations**	**NBL**	**CL**	**SBL**	**Transverse Crack**	**Longitudinal Crack**	**Corner Crack**	**Diagonal Crack**	**Widening Joint**
									TOTAL	**0**	**0**	**1**	**0**	**34**
										0.00%	**0.00%**	**0.25%**	**0.00%**	**8.50%**
				191	507+60 to 513+70	508+70	—	—	SBL	—	—	—	—	14
						509+50	NBL	—	—	—	—	—	—	20
						511+18	—	—	SBL	—	—	1	—	—
		Patch					—	—	SBL	—	—	—	—	13
						513+00	—	—	SBL	—	—	—	—	10
									TOTAL	**0**	**0**	**1**	**0**	**57**
										0.00%	**0.00%**	**0.50%**	**0.00%**	**28.50%**
				59	183+75 to 186+75	183+32	—	—	SBL	—	—	—	—	2
						183+84	—	—	SBL	—	—	—	—	4
						184+00	NBL	—	—	—	16	—	—	16
		Remove				184+14	NBL	—	—	—	—	—	—	13
						184+60	NBL	—	—	—	—	—	—	—
									TOTAL	**0**	**16**	**0**	**0**	**35**
										0.00%	**8.00%**	**0.00%**	**0.00%**	**17.50%**
A				34	120 to 124	120+23	—	—	SBL	—	—	—	—	34
						122+27	—	—	SBL	—	—	—	—	5
		Scarify	Tied Joint	36	125 to 129	126+55	—	—	SBL	—	—	1	—	—
							—	—	SBL	1	—	—	—	—
									TOTAL	**1**	**0**	**1**	**0**	**39**
										0.14%	**0.00%**	**0.14%**	**0.00%**	**5.48%**
	4.5			104	295 to 299	297+06	NBL	—	—	—	—	—	—	3
		HMA S. R.	Tied Joint	106	300 to 304	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**3**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**0.42%**
				168	455 to 459	—	—	—	—	—	—	—	—	—
		Patch	Tied Joint	170	459+50 to 463+50	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**0**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**0.00%**
	6	Scarify		38	130 to 134	132+82	—	—	SBL					1

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
				40	135 to 139	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**1**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**0.25%**
				108	305 to 309	306+82	NBL	—	—	—	—	—	—	4
						308+76	NBL	—	—	—	—	—	—	6
				110	310 to 314	312+78	—	—	SBL	—	—	1	—	—
							NBL	—	—	—	—	—	—	4
		HMA S. R.				312+95	NBL	—	—	—		2	—	—
							—	—	SBL	—	—	—	1	—
						313+58	—	—	SBL	—	—	1	—	—
									TOTAL	**0**	**0**	**4**	**1**	**14**
										0.00%	**0.00%**	**1.00%**	**0.25%**	**3.50%**
				172	464 to 468	—	—	—	—	—	—	—	—	—
		Patch		174	468+50 to 472+50	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**0**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**0.00%**
B				42	140 to 144	142+73	NBL	—	—	—	—	—	—	15
		Scarify	Tied Joint	44	145 to 149	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**15**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**2.11%**
				112	315 to 319	—	—	—	—	—	—	—	—	—
	4.5	HMA S. R.							**TOTAL**	**0**	**0**	**0**	**0**	**0**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**0.00%**
				176	473 to 477	474+82	—	—	SBL	—	—	—	—	2
						475+64	—	—	SBL	—	—	—	—	7
		Patch	Tied Joint	178	477+50 to 481+50	—	—	—	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**9**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**1.27%**
	6	Scarify		46	150 to 154	150+42	NBL	—	—	—	—	—	—	2
						152+42	NBL	—	—	—	—	—	—	2
						152+18	NBL	—	—	—	—	—	—	4
				48	155 to 159	—	—	—	—	—	—	—	—	—

Test Section Characteristics						Location of Distress				Number of Cracked Slabs				
Fiber Type	Panel Size (ft. x ft.)	Base Prep.	Tied Outer Joint	Test Section	Stations	Stations	NBL	CL	SBL	Transverse Crack	Longitudinal Crack	Corner Crack	Diagonal Crack	Widening Joint
									TOTAL	**0**	**0**	**0**	**0**	**8**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**2.00%**
				180	482 to 486	—	—	—	—	—	—	—	—	—
		Patch		182	486+50 to 490+50	487+52	—	—	SBL	—	—	—	—	3
						488+82	NBL	—	—	—	—	—	—	3
									TOTAL	**0**	**0**	**0**	**0**	**6**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**1.50%**
				50	160 to 164	—	—	—	—	—	—	—	—	—
				52	165 to 196	167+20	NBL	—	—	—	—	1	—	—
		Scarify	Tied Joint	54	170 to 174	—	—	—	—	—	—	—	—	—
				56	175 to 179	176+27	—	—	SBL					9
						179+46	—	—	SBL					9
C	9								**TOTAL**	**0**	**0**	**1**	**0**	**18**
										0.00%	**0.00%**	**0.28%**	**0.00%**	**5.06%**
				184	491 to 495	494+55	NBL	—	—	—	—	—	—	2
							—	—	SBL	—	—	—	—	1
		Patch		186	495+50 to 499+50	495+73	—	—	SBL	—	—	—	—	6
						496+64	—	—	SBL	—	—	—	—	6
						498+00	—	CL	—	—	—	—	—	—
									TOTAL	**0**	**0**	**0**	**0**	**15**
										0.00%	**0.00%**	**0.00%**	**0.00%**	**8.44%**

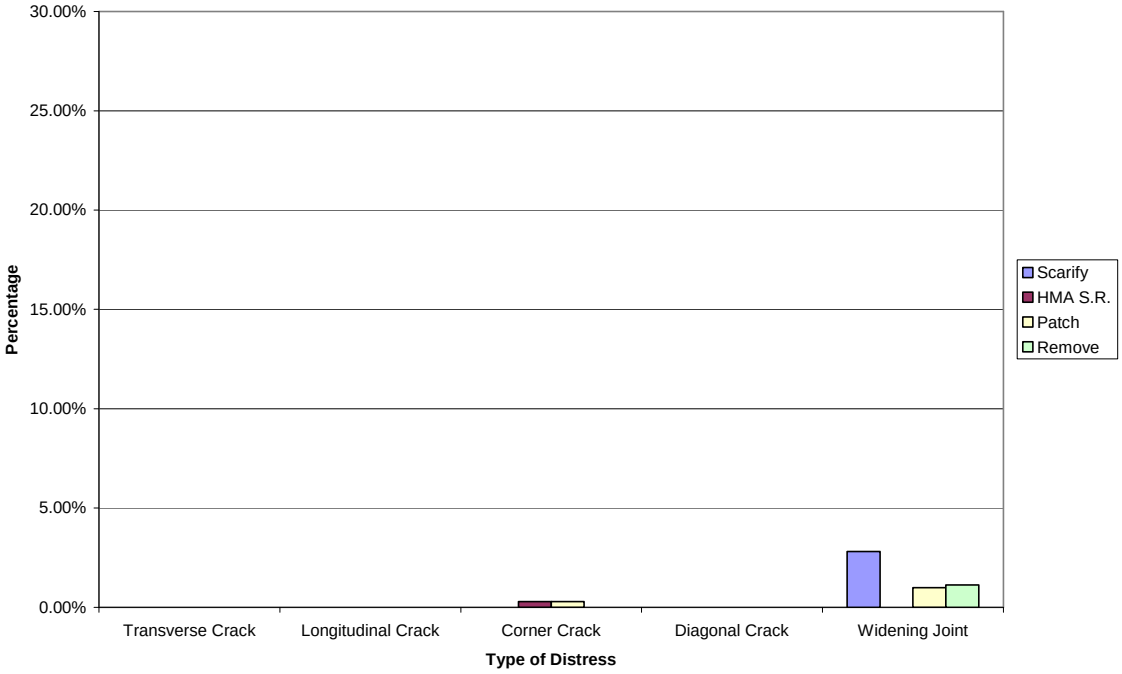

Figure D.1. Percentage of distressed slabs, 3.5” depth, no fibers, 4.5’ panel

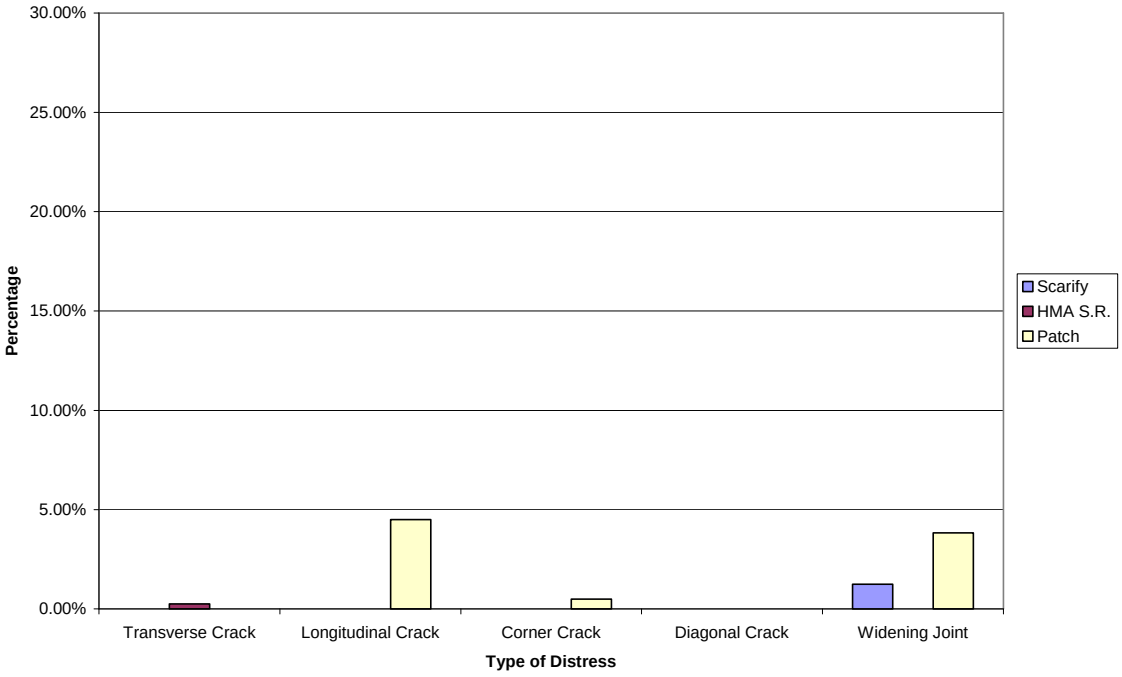

Figure D.2. Percentage of distressed slabs, 3.5” depth, no fibers, 6’ panel

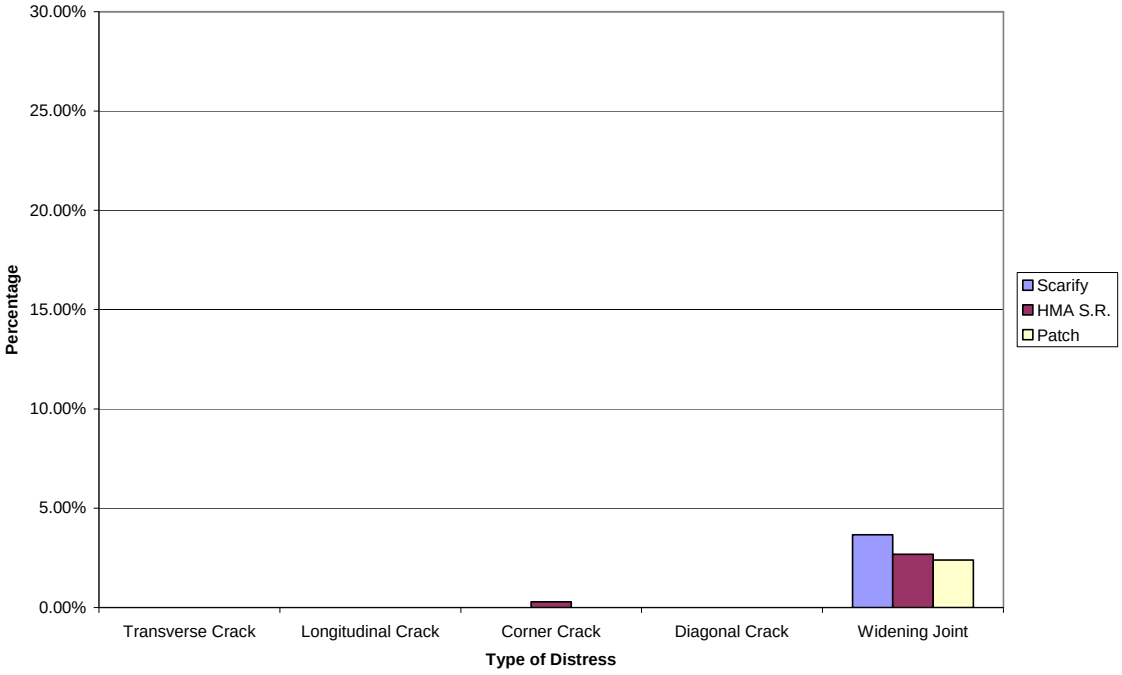

Figure D.3. Percentage of distressed slabs, 3.5” depth, fiber A, 4.5’ panel

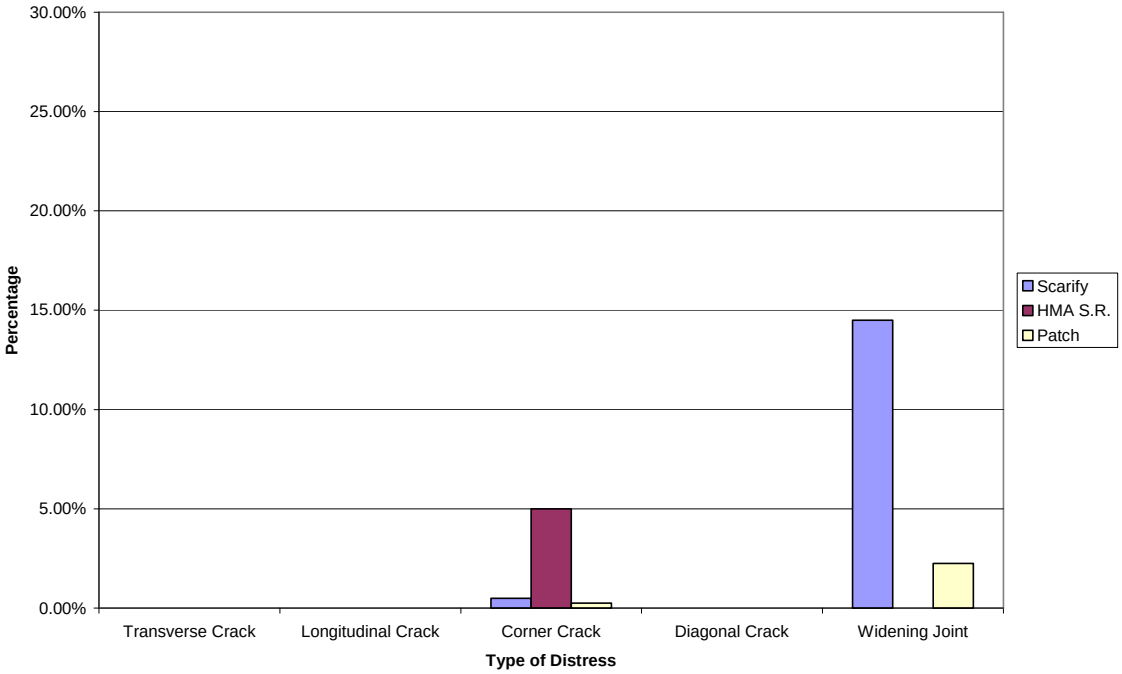

Figure D.4. Percentage of distressed slabs, 3.5” depth, fiber A, 6’ panel

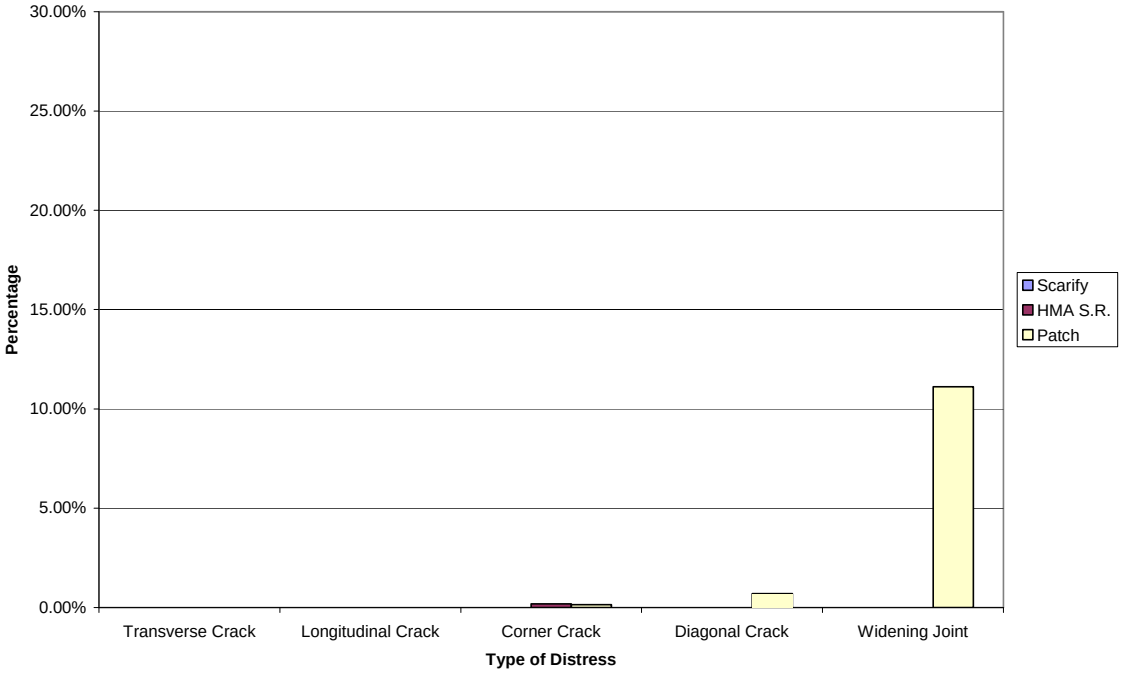

Figure D.5. Percentage of distressed slabs, 3.5” depth, fiber B, 4.5’ panel

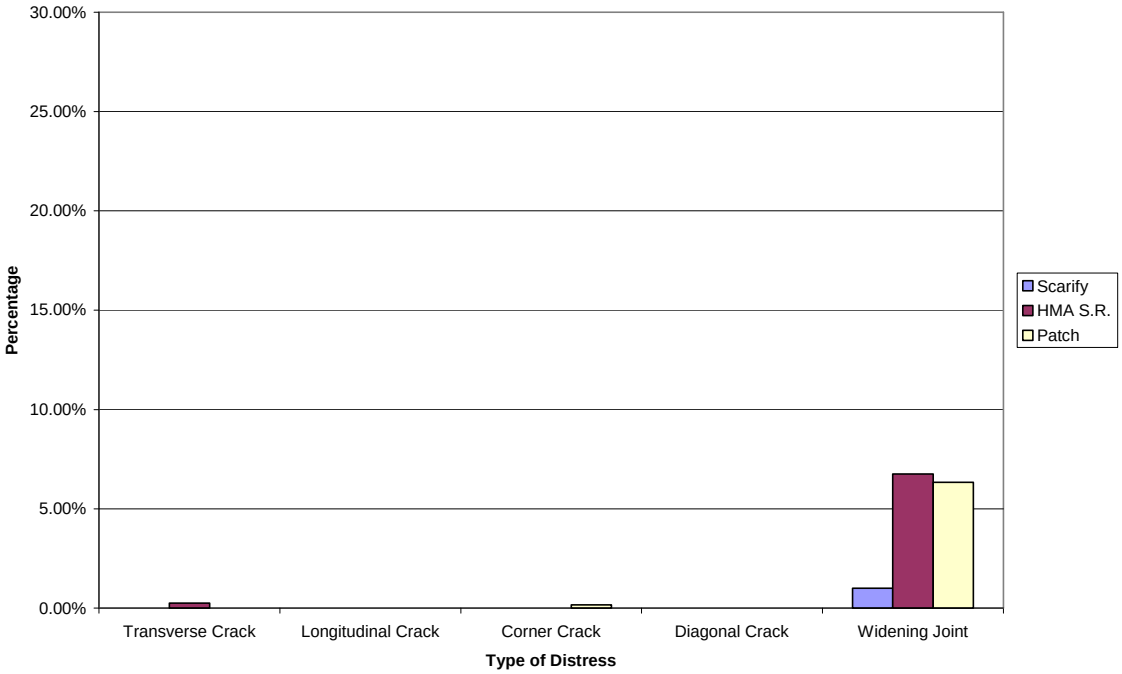

Figure D.6. Percentage of distressed slabs, 3.5” depth, fiber B, 6’ panel

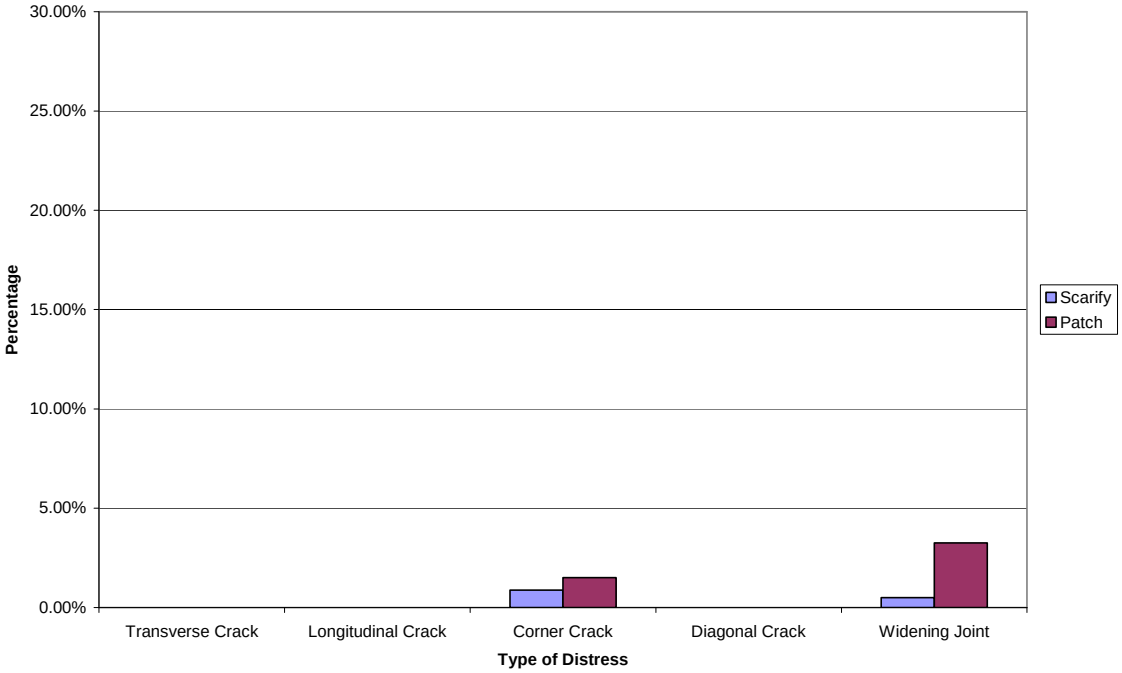

Figure D.7. Percentage of distressed slabs, 3.5” depth, fiber C, 6’ panel

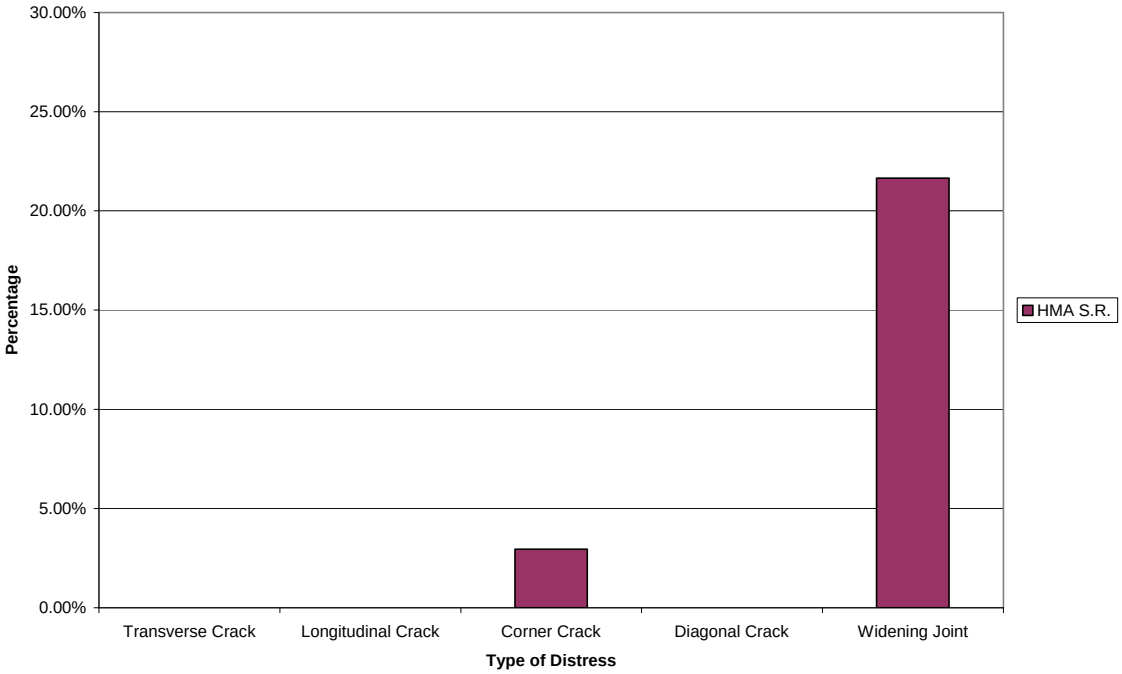

Figure D.8. Percentage of distressed slabs, 3.5” depth, fiber C, 9’ panel

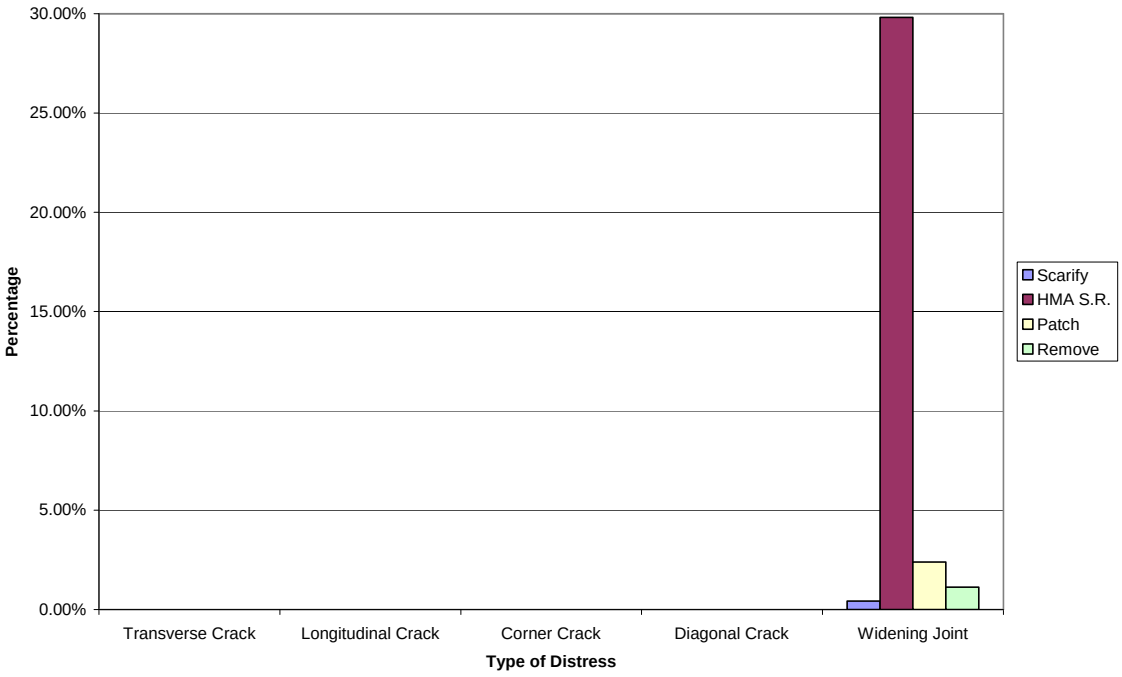

Figure D.9. Percentage of distressed slabs, 4.5” depth, no fibers, 4.5’ panel

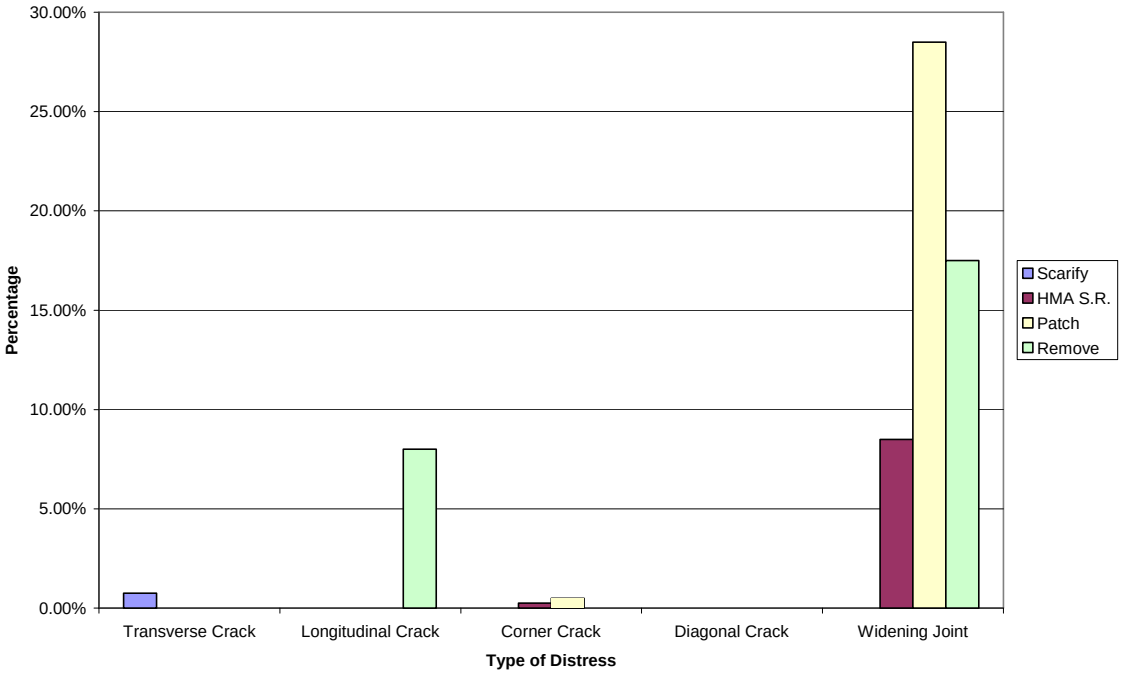

Figure D.10. Percentage of distressed slabs, 4.5” depth, no fibers, 6’ panel

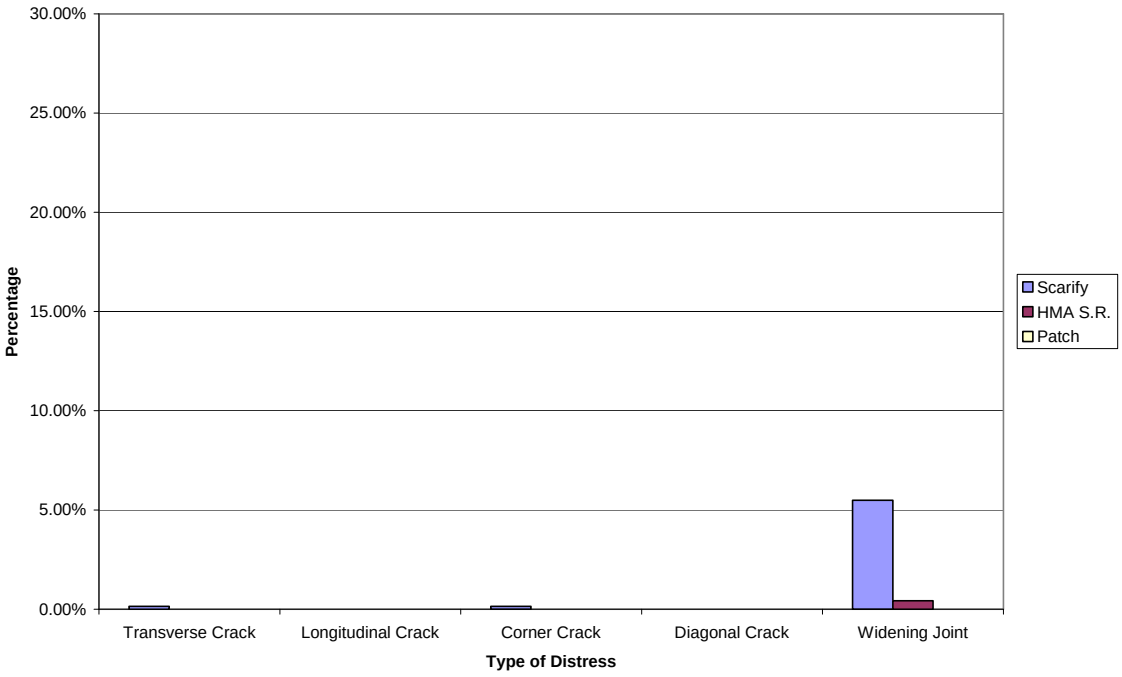

Figure D.11. Percentage of distressed slabs, 4.5” depth, fiber A, 4.5’ panel

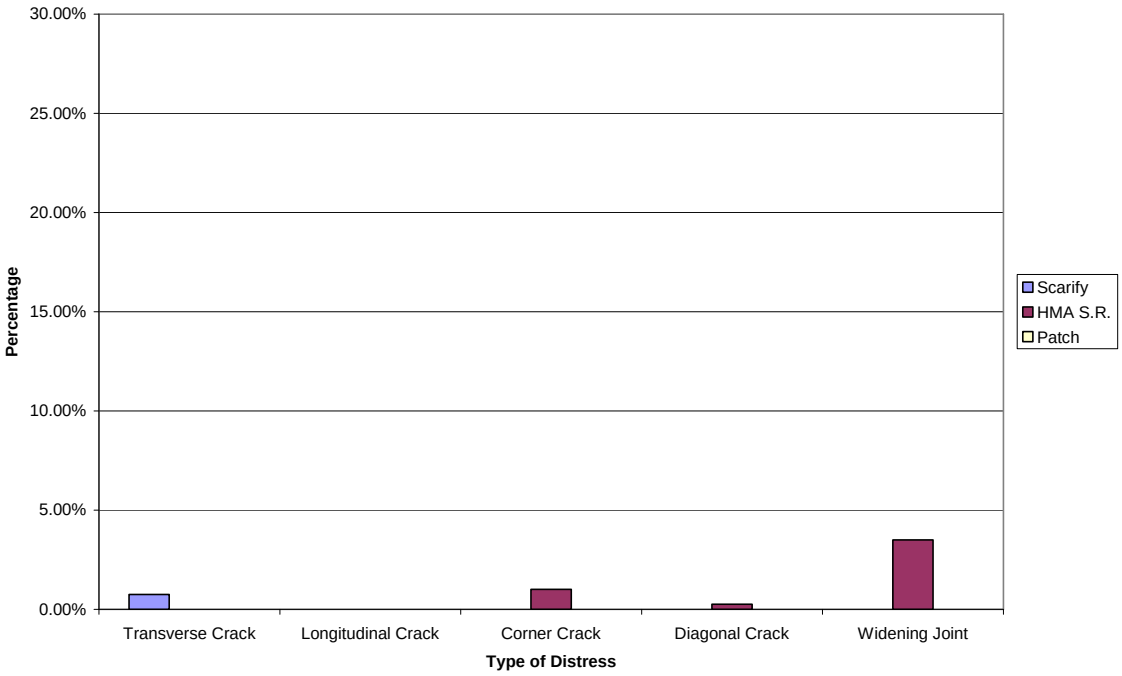

Figure D.12. Percentage of distressed slabs, 4.5” depth, fiber A, 6’ panel

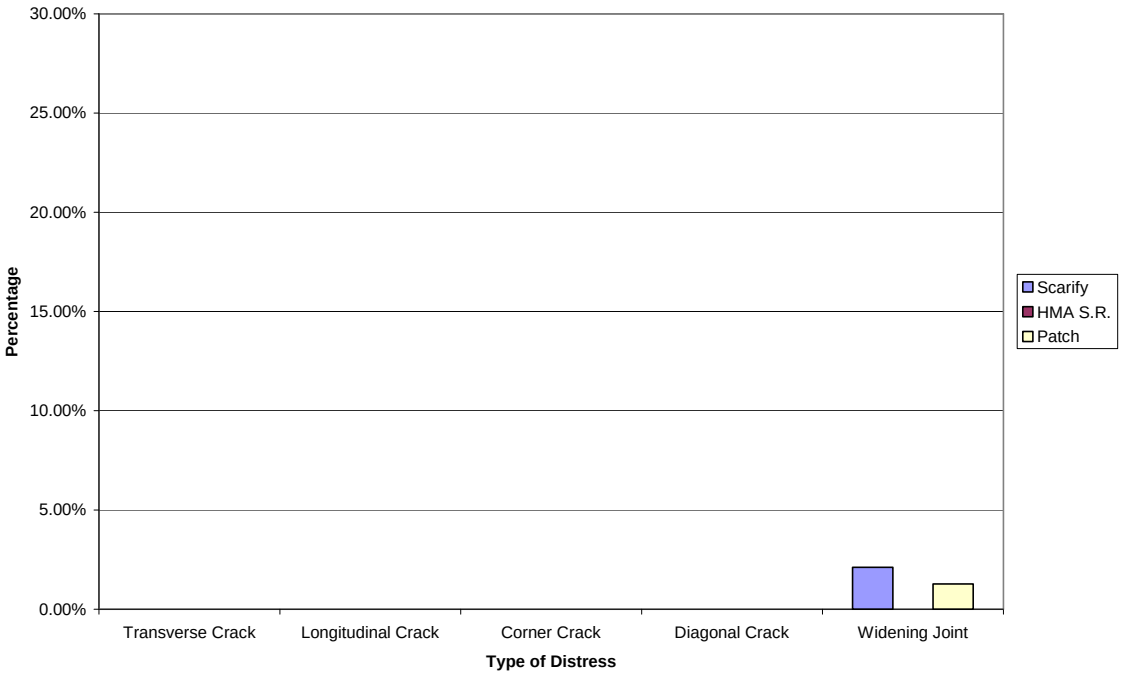

Figure D.13. Percentage of distressed slabs, 4.5” depth, fiber B, 4.5’ panel

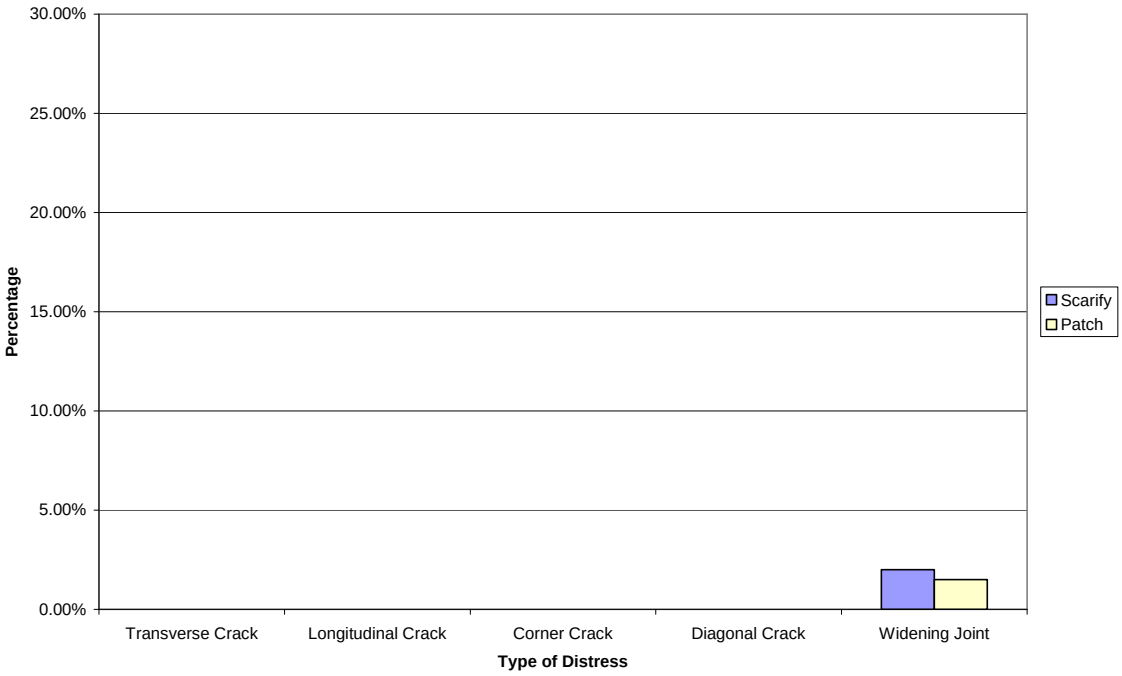

Figure D.14. Percentage of distressed slabs, 4.5” depth, fiber B, 6’ panel

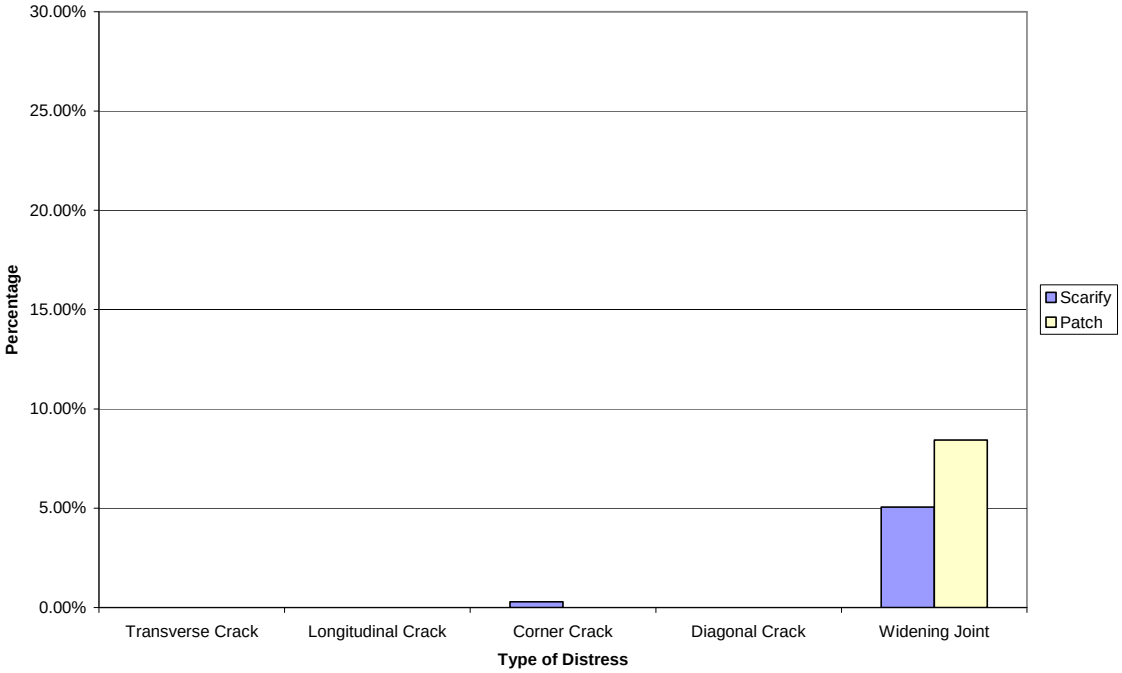

Figure D.15. Percentage of distressed slabs, 4.5” depth, fiber C, 9’ panel

APPENDIX E: WEIGH-IN-MOTION / RIGID ESALS

Table E.1. Yearly rigid ESALS

Month/Year	Number of Days per Month	Rigid ESALS per Day		Rigid ESALS per Month	
		Northbound Lane	Southbound Lane	Northbound Lane	Southbound Lane
August-02*	31	228	234	7068	7254
September-02*	30	242	250	7260	7500
October-02*	31	257	266	7967	8246
November-02*	30	271	282	8130	8460
December-02*	31	285	298	8835	9238
TOTAL ESALS				39260	40698
Jan-03	31	300	314	9300	9734
February-03	29	314	330	9106	9570
March-03	31	328	345	10168	10695
April-03	30	343	361	10290	10830
May-03	31	357	377	11067	11687
June-03	30	371	393	11130	11790
July-03	31	386	409	11966	12679
August-03	31	400	425	12400	13175
September-03	30	426	473	12780	14190
October-03	31	565	607	17515	18817
November-03	30	342	363	10260	10890
December-03	31	314	335	9734	10385
TOTAL ESALS				62689	67457
January-04	31	309	308	9579	9548
February-04	29	307	302	8903	8758
March-04	31	337	349	10447	10819
April-04	30	388	407	11640	12210
May-04	31	388	407	12028	12617
June-04	30	388	407	11640	12210
July-04	31	388	407	12028	12617
August-04	31	388	407	12028	12617
September-04	30	486	507	14580	15210
October-04	31	486	507	15066	15717
November-04	30	342	362	10260	10860
December-04	31	342	362	10602	11222
TOTAL ESALS				138801	144405
January-05	31	349	350	10819	10850
February-05	28	349	350	9772	9800
March-05	31	394	421	12214	13051

Month/Year	Number of Days per Month	Rigid ESALS per Day		Rigid ESALS per Month	
		Northbound Lane	Southbound Lane	Northbound Lane	Southbound Lane
April-05	30	446	458	13380	13740
May-05	31	446	458	13826	14198
June-05	30	446	458	13380	13740
July-05	31	446	458	13826	14198
August-05	31	446	458	13826	14198
September-05	30	446	458	13380	13740
October-05	31	446	458	13826	14198
November-05	30	398	451	11940	13530
December-05	31	355	394	11005	12214
TOTAL ESALS				151194	157457
January-02*	31	342	387	10602	11997
February-02*	28	376	405	10528	11340
March-02*	31	393	421	12183	13051
April-02*	30	435	486	13050	14580
TOTAL ESALS				46363	50968

* indiates partial year

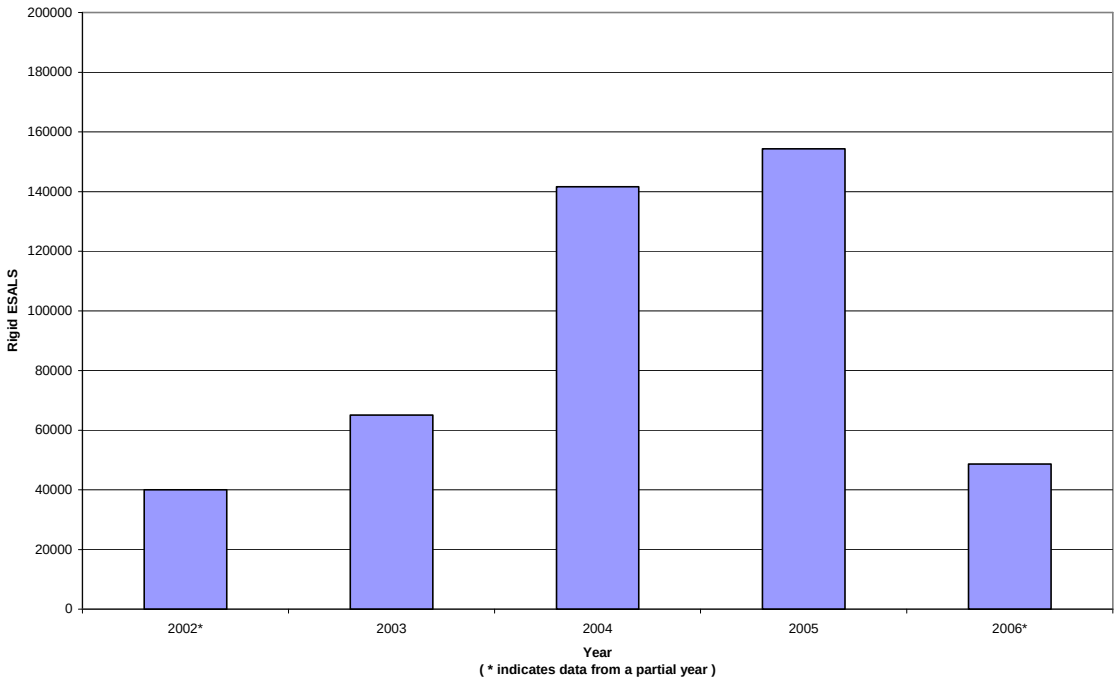

Figure E.1. Yearly rigid ESALS

Table F.1. IRI values, northbound lane, for overlays 3.5 in. thick

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
No	4.5	Scarify	23	87+00	91+00	82.6	112.4	73.2	92.1	74.9	99.1	75.0	103.2	77.3	99.8
			25	92+00	96+00	87.1	111.5	95.7	114.3	94.7	115.2	98.3	134.8	104.0	142.9
		HMA S. R.	95	275+00	279+00	144.3	123.1	135.7	126.0	123.7	117.7	148.4	127.1	131.9	149.2
			98	280+00	284+00	97.9	103.2	89.8	103.4	95.0	108.1	99.2	118.0	102.3	113.0
		Patch	160	435+00	439+00	183.6	138.6	110.6	108.6	146.7	136.1	127.5	140.2	164.3	114.9
			162	440+00	444+00	194.9	110.9	131.4	101.5	137.8	142.9	140.0	123.3	136.7	133.5
		Remove	89	259+75	263+25	87.6	91.6	85.6	93.2	110.5	113.6	111.3	97.1	96.7	99.5
	6	Scarify	27	97+00	101+00	106.8	139.7	112.1	135.5	127.0	165.8	122.5	139.2	111.9	145.9
			29	102+00	106+00	113.6	138.9	104.1	138.7	113.0	159.5	119.8	158.2	132.2	136.1
		HMA S. R.	100	285+00	289+00	109.1	102.7	100.8	88.5	133.3	110.9	109.4	117.9	114.4	108.2
			102	290+00	294+00	136.1	117.1	110.4	121.8	162.0	139.2	118.4	118.0	135.0	118.2
		Patch	164	445+00	449+00	85.3	95.5	100.5	109.6	96.4	110.7	103.6	138.8	91.2	109.6
			166	450+00	454+00	96.6	131.1	106.5	112.4	162.0	136.0	106.5	150.4	109.4	231.9
A	4.5	Scarify	33	113+50	119+50	103.8	133.6	85.1	107.3	103.0	135.6	94.7	119.3	88.0	126.6
		HMA S. R.	69	209+00	213+00	94.9	115.3	90.0	104.9	87.3	135.1	87.0	110.4	87.3	120.4
			71	214+00	218+00	104.1	111.7	96.2	102.3	93.0	106.0	100.6	103.0	86.8	98.5
		Patch	136	375+00	379+00	136.2	134.6	109.1	119.7	122.3	149.3	117.3	130.1	127.8	133.9
			138	380+00	384+00	164.9	124.7	133.8	116.9	133.4	138.1	137.2	149.9	131.0	119.3
	6	Scarify	31	107+00	113+00	109.4	123.7	126.5	105.2	140.8	134.9	127.8	131.9	116.0	123.2
		HMA S. R.	73	219+00	223+00	118.2	125.4	95.9	124.8	104.9	107.0	105.6	120.9	133.1	134.0
			75	224+00	228+00	141.5	146.5	83.0	109.4	124.3	147.7	102.7	134.6	109.3	115.4
		Patch	140	385+00	389+00	176.5	123.2	138.0	112.0	157.4	139.2	135.2	127.4	135.2	128.6
			142	390+00	394+00	166.3	159.0	126.7	142.9	135.9	129.7	124.6	155.9	146.7	162.2
B	4.5	Scarify	9	52+00	56+00	113.0	125.8	123.2	111.7	123.1	139.9	130.5	117.3	118.0	164.4
		HMA S. R.	77	229+00	233+00	133.9	113.4	102.5	114.3	132.0	109.9	108.3	136.2	138.0	117.2
			79	234+00	238+00	120.9	125.8	105.3	131.8	114.2	138.7	109.8	141.4	119.7	103.2
		Patch	144	395+00	399+00	148.6	142.7	129.6	122.4	213.0	136.3	135.2	148.5	215.7	146.8
			146	400+00	404+00	114.5	121.6	111.9	99.9	110.0	105.4	99.9	119.8	105.0	162.7
	6	Scarify	11	57+00	61+00	106.5	133.4	92.2	120.1	137.5	131.2	98.8	108.1	112.9	134.2
			13	62+00	66+00	83.4	105.2	79.1	104.3	130.5	100.3	98.0	117.0	93.6	114.6
		HMA S. R.	81	239+00	243+00	105.9	91.6	129.7	96.7	111.3	115.4	96.2	90.7	97.4	109.6
			83	244+00	248+00	102.4	105.7	102.4	105.5	131.8	126.9	113.6	120.4	108.2	118.3

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
		Patch	148	405+00	409+00	125.6	113.1	133.6	121.6	140.9	140.0	130.6	132.1	125.1	128.3
			150	410+00	414+00	141.3	115.3	175.7	126.2	144.6	140.3	135.1	128.9	169.3	119.4
C	6	Scarify	15	67+00	71+00	242.4	125.3	91.3	106.6	128.7	128.4	104.1	127.2	100.5	120.5
			17	72+00	76+00	128.0	128.0	96.8	122.8	115.9	139.7	103.8	130.0	113.2	144.7
			19	77+00	81+00	94.3	121.7	95.3	115.3	94.0	135.9	100.8	126.1	102.3	147.0
			21	82+00	86+00	87.0	99.6	88.4	105.6	98.2	108.8	102.1	116.3	92.5	108.5
		Patch	152	415+00	419+00	111.4	107.0	117.0	117.6	113.9	127.8	121.2	122.6	125.5	127.8
			154	420+00	424+00	144.0	139.8	157.5	131.0	150.9	152.1	135.4	166.6	196.1	118.3
			156	425+00	429+00	154.6	152.9	142.7	136.9	162.2	147.6	234.1	163.4	170.5	179.4
			158	430+00	434+00	147.4	126.0	128.2	104.0	116.6	132.5	146.0	124.7	132.9	142.5
	9	HMA S. R.	85	249+00	253+00	97.7	108.6	85.2	113.6	95.8	105.7	107.8	114.1	99.7	114.9
			87	254+00	258+00	132.8	114.1	93.9	106.1	102.1	120.0	116.4	125.1	102.5	122.0
			91	265+00	269+00	102.7	121.0	143.3	121.0	100.8	126.2	118.0	129.4	106.5	111.9
			93	270+00	274+00	104.8	118.3	88.9	106.1	94.6	118.2	114.3	128.6	114.0	107.9

Table F.2. IRI values, northbound lane, for overlays 4.5 in. thick

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
No	4.5	Scarify	61	189+00	193+00	81.5	102.7	77.2	110.9	82.2	105.6	86.5	117.9	141.5	120.8
			63	194+00	198+00	82.1	98.5	95.3	105.8	108.3	123.1	97.8	115.2	92.4	122.9
		HMA S. R.	128	355+00	359+00	121.1	146.9	95.0	123.4	121.1	151.6	134.8	159.7	103.3	164.0
			130	360+00	364+00	107.7	121.9	79.4	96.9	102.1	135.7	110.8	112.1	98.2	125.3
		Patch	189	500+50	506+60	99.5	120.1	105.8	104.6	113.4	116.5	102.4	110.9	104.0	104.1
	6	Scarify	65	199+00	203+00	94.5	114.0	82.2	97.3	88.8	106.9	100.3	113.4	105.0	111.7
			67	204+00	208+00	99.3	105.3	85.7	107.9	84.2	96.9	95.8	109.8	87.4	102.2
		HMA S. R.	132	365+00	369+00	127.2	136.0	108.7	128.1	101.3	141.2	97.6	138.3	107.2	150.7
			134	370+00	374+00	195.5	116.9	95.4	104.5	113.4	168.3	97.6	188.6	104.2	114.3
		Patch	191	507+60	513+70	106.9	123.8	101.5	117.3	159.5	139.5	133.5	127.5	123.0	124.8
		Remove	59	183+75	186+75	110.3	133.2	89.3	105.2	111.6	128.6	134.7	105.7	137.1	116.3
A	4.5	Scarify	34	120+00	124+00	100.8	114.6	91.6	107.2	86.7	99.7	141.0	104.9	101.0	103.1
			36	125+00	129+00	81.6	101.6	83.0	101.5	89.0	95.1	96.6	106.6	90.8	109.9

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
		HMA S. R.	104	295+00	299+00	116.2	107.2	122.5	116.2	129.3	117.5	187.2	110.6	214.5	120.9
			106	300+00	304+00	125.7	125.5	117.3	122.7	107.0	126.2	114.6	121.0	121.7	116.6
		Patch	168	455+00	459+00	120.3	132.1	107.5	104.9	115.7	123.2	115.6	111.9	124.7	119.5
			170	459+50	463+50	137.3	126.5	130.1	138.9	137.2	151.9	136.5	139.3	132.7	136.1
	6	Scarify	38	130+00	134+00	140.9	130.7	118.1	128.6	123.4	126.8	129.5	134.1	126.9	136.8
			40	135+00	139+00	129.2	115.2	133.7	111.7	113.3	114.7	109.9	121.0	110.9	103.2
		HMA S. R.	108	305+00	309+00	87.5	111.9	100.9	110.2	91.1	109.6	107.3	103.8	114.6	120.7
			110	310+00	314+00	117.5	129.6	87.0	128.5	116.0	107.9	109.6	143.9	94.8	104.9
		Patch	172	464+00	468+00	109.2	125.9	94.4	135.3	101.6	136.4	107.5	122.4	92.5	130.7
			174	468+50	472+50	134.0	128.5	95.3	122.1	104.2	117.6	104.4	125.1	102.1	121.9
B	4.5	Scarify	42	140+00	144+00	124.6	115.7	110.4	124.1	111.5	141.5	105.6	128.8	105.6	141.8
			44	145+00	149+00	106.9	112.8	114.2	106.8	121.6	122.3	114.4	117.0	99.7	103.5
		HMA S. R.	112	315+00	319+00	118.9	104.3	102.7	111.8	121.8	122.4	226.8	115.1	123.4	130.6
			114	320+00	324+00	130.9	118.1	92.6	83.2	105.9	97.2	110.3	102.5	93.6	87.7
		Patch	176	473+00	477+00	107.5	104.8	104.6	130.3	127.0	144.9	114.2	134.4	119.9	132.9
			178	477+50	481+50	125.0	126.0	115.5	123.4	118.6	127.6	121.6	127.3	125.6	148.7
	6	Scarify	46	150+00	154+00	198.9	116.4	123.5	106.9	141.5	136.1	139.7	127.1	139.1	137.5
			48	155+00	159+00	119.7	121.0	107.3	113.5	116.0	139.0	121.9	121.1	160.7	145.4
		HMA S. R.	116	325+00	329+00	114.7	134.9	102.1	110.8	106.7	132.2	118.3	122.6	124.1	123.9
			118	330+00	334+00	163.7	138.9	120.7	114.9	118.0	125.8	119.5	134.6	113.4	131.5
		Patch	180	482+00	486+00	103.4	108.8	95.1	99.6	120.2	120.7	136.1	115.7	125.1	126.5
			182	486+50	490+50	115.9	123.7	88.9	104.2	105.1	115.3	96.1	123.8	116.9	162.0
C	9	Scarify	50	160+00	164+00	113.3	133.0	99.4	128.1	104.1	135.7	123.3	136.5	107.8	154.6
			52	165+00	169+00	117.5	134.7	121.2	131.6	119.8	150.0	114.7	155.4	111.1	158.8
			54	170+00	174+00	106.1	121.8	112.7	138.6	125.2	127.5	136.9	147.3	111.7	152.4
			56	175+00	179+00	85.7	98.0	84.7	92.5	92.8	104.1	102.9	105.3	91.5	91.3
		HMA S. R.	120	335+00	339+00	109.9	124.4	106.6	107.3	134.8	139.5	113.5	122.3	103.5	124.6
			122	340+00	344+00	112.5	120.1	107.5	101.7	103.5	108.8	144.9	130.8	106.0	103.9
			124	345+00	349+00	125.1	127.5	103.6	126.7	110.7	133.0	123.9	116.5	107.6	132.0
			126	350+00	354+00	126.6	133.4	114.6	113.8	120.4	128.9	142.0	143.2	102.5	147.6
		Patch	184	491+00	495+00	94.5	122.4	97.4	109.8	97.7	109.5	110.4	116.0	104.8	122.5
			186	495+50	499+50	106.4	118.3	113.5	112.1	122.7	118.0	114.2	108.2	101.4	103.7

Table F.3. IRI values, southbound lane, for overlays 3.5 in. thick

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
No	4.5	Scarify	23	87+00	91+00	79.0	84.3	84.8	98.8	87.6	108.1	88.3	112.2	82.2	116.7
			25	92+00	96+00	96.3	94.0	98.6	106.4	96.3	117.1	112.5	118.5	126.1	111.4
		HMA S. R.	95	275+00	279+00	144.8	129.0	127.4	118.0	118.9	111.1	147.7	128.2	117.8	120.3
			98	280+00	284+00	111.4	98.1	130.6	107.1	115.3	109.2	94.6	107.3	109.0	106.7
		Patch	160	435+00	439+00	260.8	112.2	115.1	113.1	131.2	137.6	112.8	126.3	145.4	118.4
			162	440+00	444+00	122.2	108.8	102.4	100.0	107.5	124.9	108.3	111.8	107.7	111.4
		Remove	89	259+75	263+25	87.4	88.8	88.4	89.5	94.9	96.8	105.2	98.6	95.9	144.5
	6	Scarify	27	97+00	101+00	109.6	101.9	95.9	117.6	97.0	101.4	107.6	133.4	109.4	122.3
			29	102+00	106+00	142.6	112.7	160.2	98.9	125.8	119.2	108.1	90.8	116.5	117.1
		HMA S. R.	100	285+00	289+00	83.6	111.1	93.6	99.0	102.0	99.4	94.5	104.2	90.2	105.5
			102	290+00	294+00	101.9	119.9	92.4	112.1	102.0	105.0	99.5	117.3	103.3	117.7
		Patch	164	445+00	449+00	114.3	112.4	84.3	91.5	105.8	119.3	101.8	144.0	138.9	141.3
			166	450+00	454+00	103.6	107.8	92.5	102.7	136.3	134.4	97.2	113.8	94.3	222.0
A	4.5	Scarify	33	113+50	119+50	109.1	102.1	94.8	100.8	130.4	127.4	107.9	97.7	96.8	134.1
		HMA S. R.	69	209+00	213+00	110.6	115.6	68.0	93.6	94.3	102.7	87.7	128.5	115.4	114.5
			71	214+00	218+00	100.3	101.5	93.9	105.2	99.6	94.8	91.6	111.1	88.7	109.7
		Patch	136	375+00	379+00	174.3	145.1	124.5	125.5	168.5	140.2	113.3	188.4	122.8	153.0
			138	380+00	384+00	117.3	127.0	128.2	113.3	123.0	140.2	118.9	155.3	114.7	127.3
	6	Scarify	31	107+00	113+00	124.1	135.5	105.7	109.2	130.1	147.9	123.7	119.7	107.2	124.4
		HMA S. R.	73	219+00	223+00	119.4	105.4	111.6	118.2	114.7	134.4	121.3	130.0	167.0	137.1
			75	224+00	228+00	129.1	105.2	96.1	112.6	104.4	121.5	104.4	122.1	112.7	124.5
		Patch	140	385+00	389+00	123.0	129.5	112.2	131.1	111.9	134.3	145.8	149.3	118.1	135.9
			142	390+00	394+00	119.5	146.9	132.2	143.3	259.4	160.3	133.7	146.5	126.5	149.6
B	4.5	Scarify	9	52+00	56+00	108.6	118.0	105.2	107.0	113.9	117.9	117.9	127.8	124.4	157.2
		HMA S. R.	77	229+00	233+00	115.0	126.1	113.3	129.3	157.9	126.2	124.7	126.8	119.2	110.0
			79	234+00	238+00	116.0	127.3	157.2	116.0	137.1	130.1	135.9	121.3	108.6	120.4
		Patch	144	395+00	399+00	119.5	127.7	126.2	127.0	110.1	142.3	111.6	135.3	107.6	147.6
			146	400+00	404+00	105.9	127.1	105.4	111.2	105.2	123.7	121.9	113.8	134.7	145.6
	6	Scarify	11	57+00	61+00	109.2	138.6	150.8	108.5	116.8	150.3	111.6	136.4	109.3	120.5
			13	62+00	66+00	130.1	113.6	84.1	114.4	105.9	110.5	96.9	119.6	82.5	90.0
		HMA S. R.	81	239+00	243+00	127.6	105.3	108.3	113.1	129.5	127.7	104.4	123.9	119.7	111.6
			83	244+00	248+00	169.3	115.5	109.8	116.2	110.8	102.0	119.0	126.2	132.1	110.1

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
		Patch	148	405+00	409+00	109.6	115.8	98.7	112.3	129.9	133.3	126.7	123.2	106.1	115.0
			150	410+00	414+00	141.6	145.1	99.0	123.7	163.2	128.4	98.5	119.8	120.4	149.8
C	6	Scarify	15	67+00	71+00	107.3	91.1	137.9	105.5	132.9	112.6	104.0	117.2	97.1	92.7
			17	72+00	76+00	167.9	135.6	135.4	116.2	124.8	100.9	120.6	117.5	257.9	118.4
			19	77+00	81+00	157.8	128.9	101.5	122.6	127.3	99.8	112.4	125.1	346.4	117.7
			21	82+00	86+00	171.2	107.2	92.8	100.0	125.0	104.3	110.6	98.7	165.2	95.6
		Patch	152	415+00	419+00	119.3	123.6	115.0	101.5	127.0	113.6	115.7	139.3	103.8	111.1
			154	420+00	424+00	167.4	139.5	136.3	130.1	126.1	124.8	147.6	118.8	198.7	127.6
			156	425+00	429+00	146.4	157.5	131.3	148.1	131.0	169.1	131.0	169.1	148.2	162.3
			158	430+00	434+00	144.2	123.6	99.9	107.8	134.3	129.8	123.9	126.1	107.2	112.5
	9	HMA S. R.	85	249+00	253+00	87.5	97.9	89.6	111.2	102.8	96.2	111.3	113.4	155.2	95.1
			87	254+00	258+00	101.8	107.5	98.8	111.0	100.4	145.9	126.2	118.1	102.8	111.9
			91	265+00	269+00	114.1	116.8	89.7	112.7	104.8	127.0	100.9	117.0	105.7	116.2
			93	270+00	274+00	114.0	100.6	105.2	96.2	118.6	122.7	117.1	104.0	110.2	105.4

Table F.4. IRI values, southbound lane, for overlays 4.5 in. thick

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
No	4.5	Scarify	61	189+00	193+00	86.8	94.7	183.1	108.0	122.1	104.1	104.7	117.6	93.7	102.1
			63	194+00	198+00	91.1	106.4	88.5	104.0	85.7	86.2	103.1	124.9	105.2	122.2
		HMA S. R.	128	355+00	359+00	109.1	116.0	107.7	117.6	104.7	122.8	122.4	133.1	96.9	118.6
			130	360+00	364+00	88.6	108.3	83.2	96.9	95.8	116.7	94.8	128.6	87.6	93.4
		Patch	189	500+50	506+60	99.2	107.7	98.1	114.2	96.7	105.1	91.9	132.1	101.7	139.0
	6	Scarify	65	199+00	203+00	105.0	104.2	114.2	102.9	158.8	133.3	112.4	112.8	110.9	112.6
			67	204+00	208+00	293.0	102.5	97.7	110.5	170.8	103.9	144.3	109.2	111.8	117.0
		HMA S. R.	132	365+00	369+00	107.7	99.6	125.8	115.3	112.7	116.5	89.3	132.7	102.2	144.8
			134	370+00	374+00	107.9	113.0	118.2	115.0	94.2	109.9	135.3	126.1	103.3	169.4
		Patch	191	507+60	513+70	135.3	131.3	104.5	122.3	224.7	126.0	115.1	121.7	168.8	129.2
		Remove	59	183+75	186+75	91.9	106.4	97.9	112.8	128.5	118.6	118.5	114.5	103.5	141.9

Fiber Type	Panel Size (ft x ft)	Base Prep.	Section No.	Station to Station		Profile IRI Values									
						Fall 2003		Spring 2004		Spring 2005		Fall 2005		Spring 2006	
						Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path	Inside Path	Outside Path
A	4.5	Scarify	34	120+00	124+00	105.1	98.9	103.8	98.2	112.7	106.9	134.2	107.0	143.5	116.6
			36	125+00	129+00	88.8	85.6	86.7	89.0	97.0	95.0	88.8	92.4	90.8	78.2
		HMA S. R.	104	295+00	299+00	113.1	107.1	127.7	109.4	129.3	117.5	122.1	100.9	149.8	114.6
			106	300+00	304+00	107.5	130.5	106.3	120.2	107.0	126.2	111.9	149.1	105.5	127.5
		Patch	168	455+00	459+00	110.9	129.3	109.9	157.8	163.2	124.6	105.4	115.6	255.6	158.2
			170	459+50	463+50	115.6	136.0	122.8	173.7	114.3	133.4	116.9	163.1	104.0	145.2
	6	Scarify	38	130+00	134+00	116.8	136.8	103.5	112.6	117.2	125.0	114.0	124.3	119.5	104.7
			40	135+00	139+00	98.5	120.6	99.8	152.1	104.8	158.8	102.7	153.1	111.3	140.1
		HMA S. R.	108	305+00	309+00	124.3	106.1	103.2	112.3	93.1	103.3	140.4	103.9	95.9	116.7
			110	310+00	314+00	130.0	130.7	96.3	111.7	117.7	120.1	114.4	116.1	123.2	122.6
		Patch	172	464+00	468+00	100.5	126.2	88.9	105.6	78.5	103.4	89.0	108.7	103.0	149.2
			174	468+50	472+50	109.2	125.3	93.4	101.0	129.1	134.3	113.0	126.6	89.2	103.7
B	4.5	Scarify	42	140+00	144+00	106.1	129.7	110.0	143.9	107.8	121.3	132.5	177.6	119.3	167.1
			44	145+00	149+00	102.2	94.0	118.6	105.0	101.5	107.4	109.5	115.6	104.7	105.2
		HMA S. R.	112	315+00	319+00	112.4	116.2	99.1	99.4	105.6	132.3	107.6	121.2	97.0	122.4
			114	320+00	324+00	83.8	96.2	97.9	107.2	80.6	106.8	111.6	107.3	85.2	126.6
		Patch	176	473+00	477+00	107.7	117.2	95.1	110.9	111.6	120.3	89.8	109.7	151.0	113.8
			178	477+50	481+50	121.6	137.7	117.6	139.7	108.7	183.2	114.5	149.0	112.8	134.6
	6	Scarify	46	150+00	154+00	169.2	136.6	123.8	117.6	171.0	125.9	145.2	142.6	153.1	131.1
			48	155+00	159+00	109.0	110.4	128.8	151.0	115.4	116.4	115.7	128.6	95.4	112.2
		HMA S. R.	116	325+00	329+00	117.8	115.3	101.0	98.1	109.5	97.6	102.5	99.2	114.9	93.6
			118	330+00	334+00	108.9	119.5	100.4	102.6	111.8	116.6	107.6	122.0	108.8	100.5
		Patch	180	482+00	486+00	94.8	109.8	99.4	96.3	95.8	108.7	129.2	123.9	107.2	118.2
			182	486+50	490+50	95.6	112.6	86.9	100.8	131.5	143.0	91.0	105.1	127.9	143.4
C	9	Scarify	50	160+00	164+00	107.4	129.7	112.6	139.5	100.4	122.0	107.5	122.7	108.7	121.9
			52	165+00	169+00	142.1	156.1	100.6	134.8	131.6	153.9	118.5	140.5	131.1	143.1
			54	170+00	174+00	117.8	109.5	122.4	117.9	119.1	133.2	132.6	123.8	102.3	115.6
			56	175+00	179+00	95.8	107.8	100.4	97.1	98.3	123.6	115.0	117.6	121.7	134.5
		HMA S. R.	120	335+00	339+00	92.1	113.9	94.8	113.9	92.6	126.9	102.6	109.8	98.5	125.4
			122	340+00	344+00	108.1	119.3	97.9	107.0	107.7	138.3	108.2	121.9	120.8	141.8
			124	345+00	349+00	94.4	98.3	97.0	110.4	103.7	113.9	113.3	107.8	94.1	145.4
			126	350+00	354+00	110.6	104.8	111.1	119.3	116.3	111.3	125.2	118.4	142.2	146.6
		Patch	184	491+00	495+00	150.8	132.2	105.0	98.0	208.3	134.2	110.1	103.7	157.8	162.0
			186	495+50	499+50	93.1	95.8	99.8	99.7	97.1	117.4	98.5	118.5	113.1	120.3

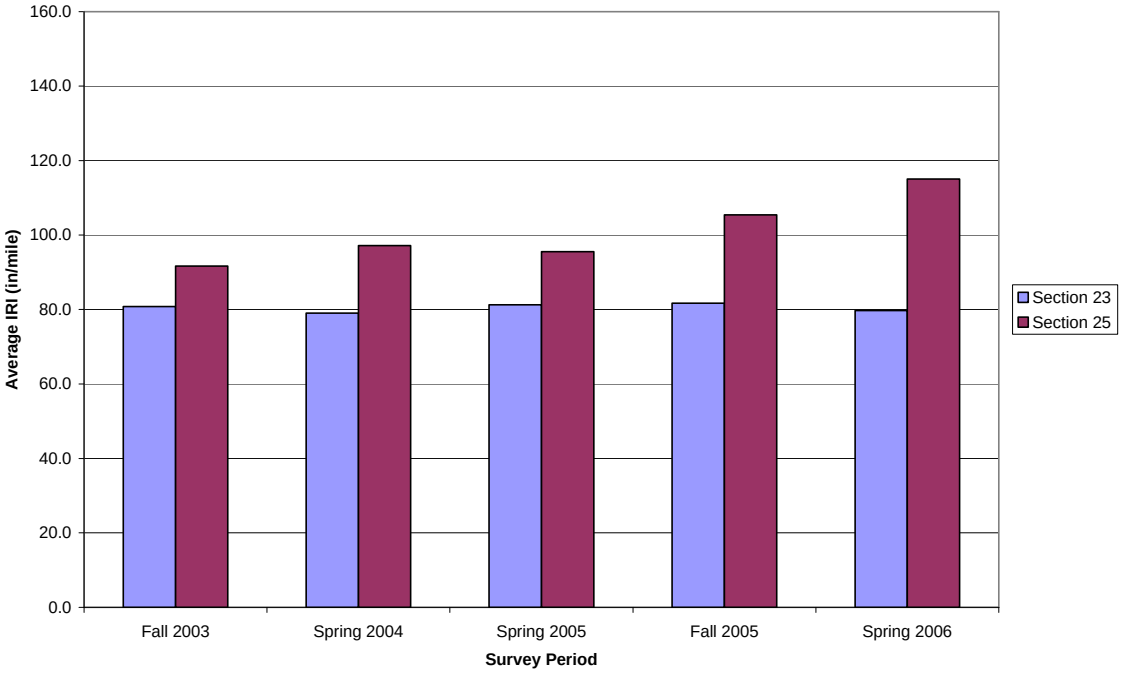

Figure F.1. IRI inside wheel path, 3.5” depth, scarify, no fibers, 4.5’ panel

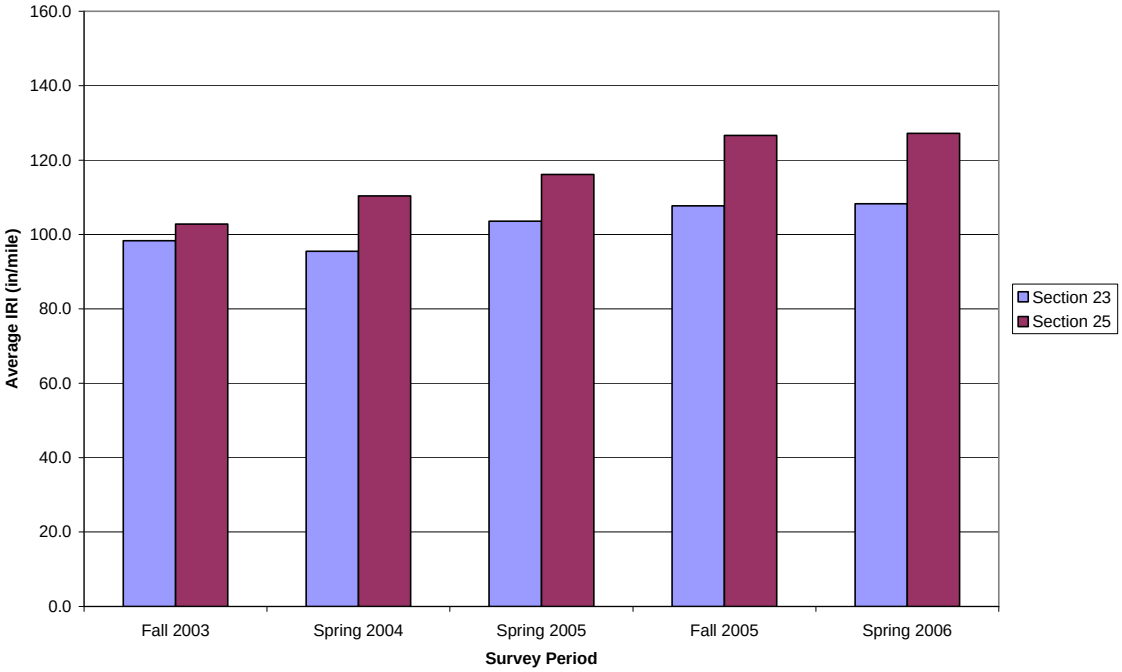

Figure F.2. IRI outside wheel path, 3.5” depth, scarify, no fibers, 4.5’ panel

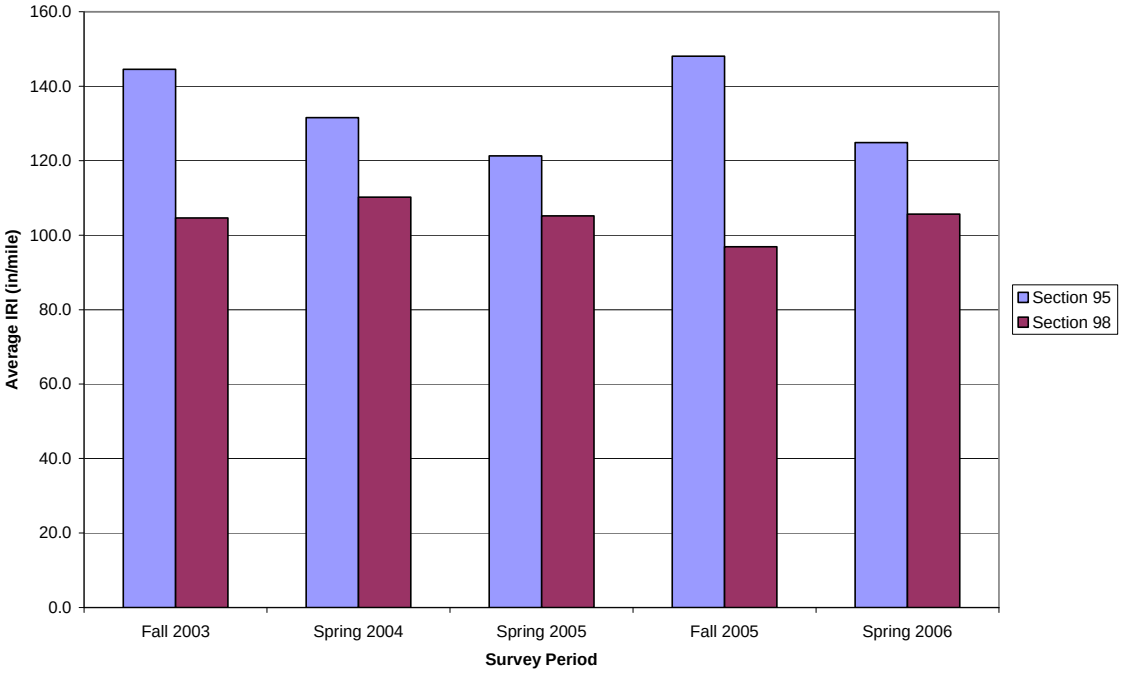

Figure F.3. IRI inside wheel path, 3.5” depth, HMA S. R., no fibers, 4.5’ panel

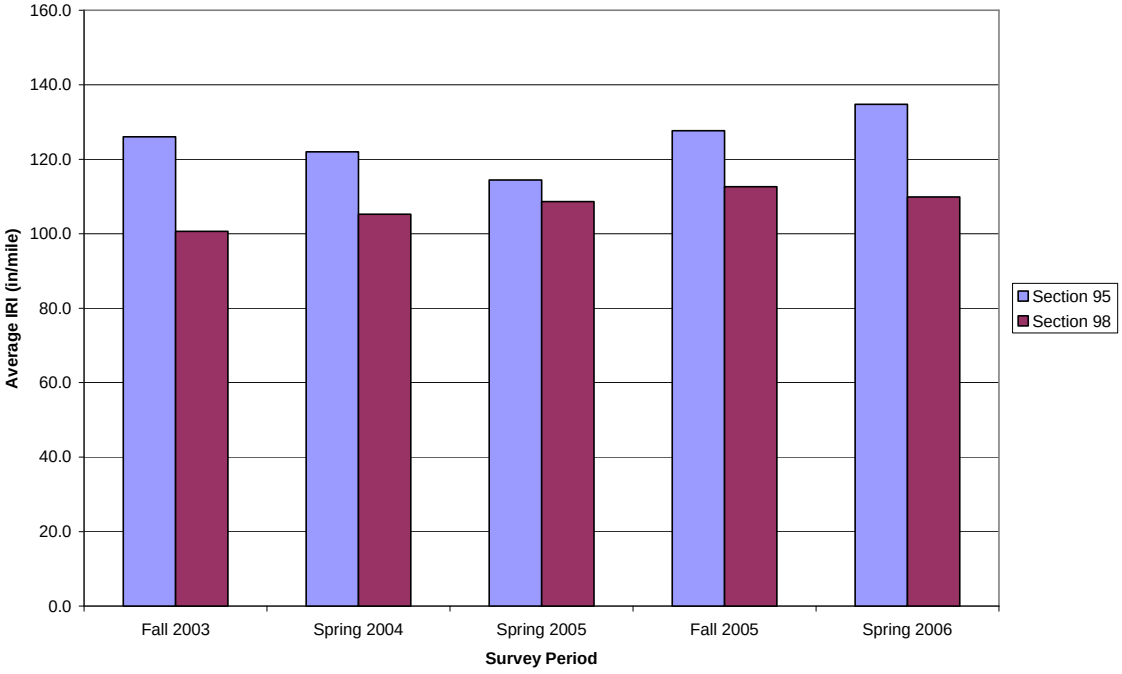

Figure F.4. IRI outside wheel path, 3.5” depth, HMA S. R., no fibers, 4.5’ panel

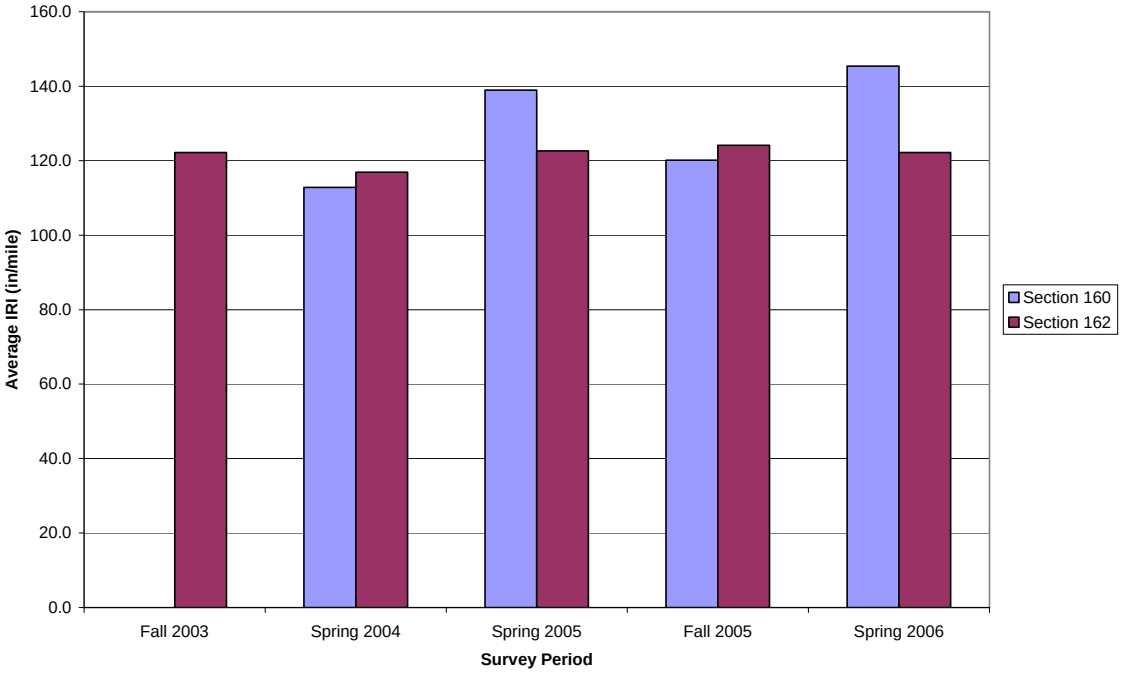

Figure F.5. IRI inside wheel path, 3.5” depth, patch, no fibers, 4.5’ panel

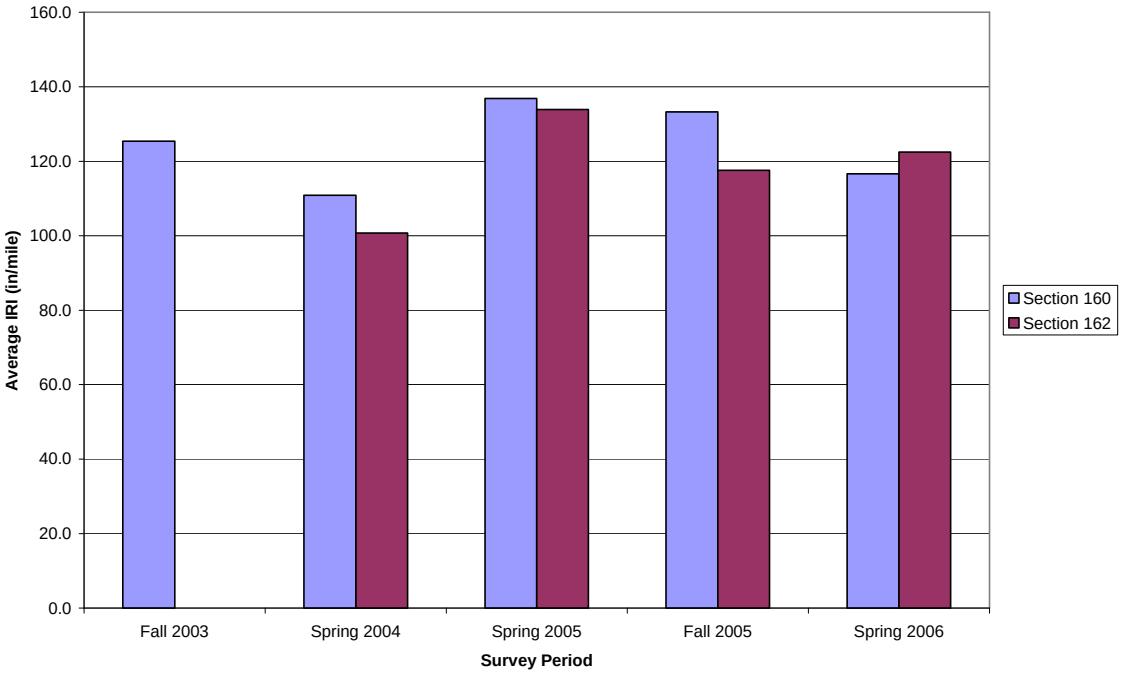

Figure F.6. IRI outside wheel path, 3.5” depth, patch, no fibers, 4.5’ panel

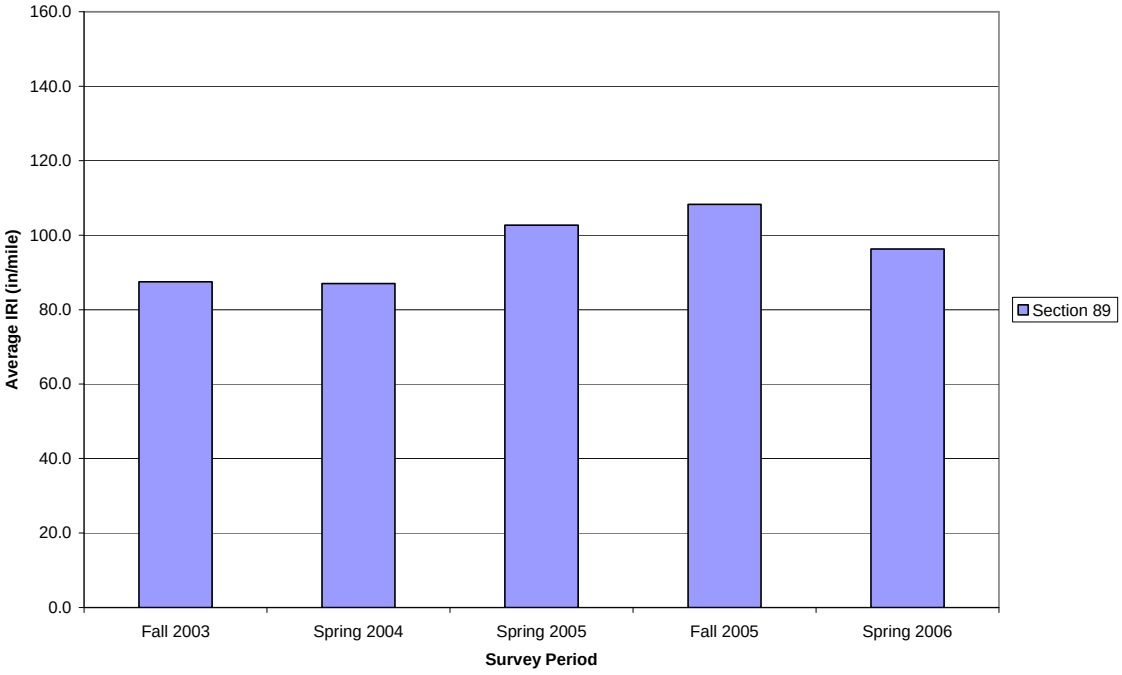

Figure F.7. IRI inside wheel path, 3.5” depth, remove, no fibers, 4.5’ panel

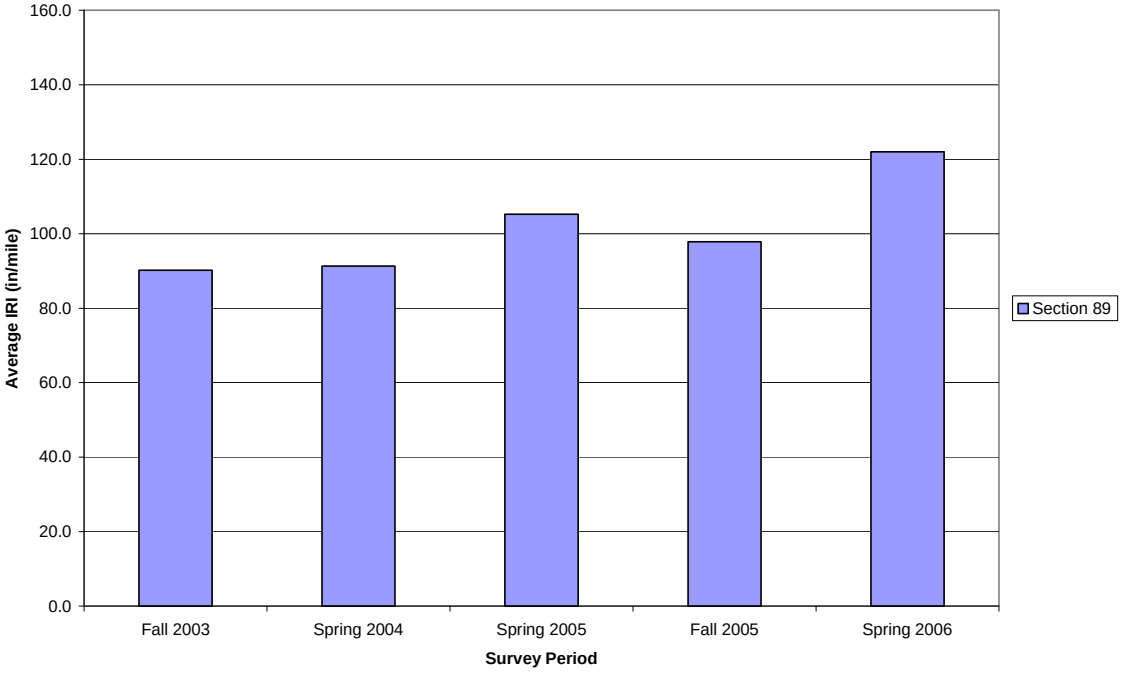

Figure F.8. IRI outside wheel path, 3.5” depth, remove, no fibers, 4.5’ panel

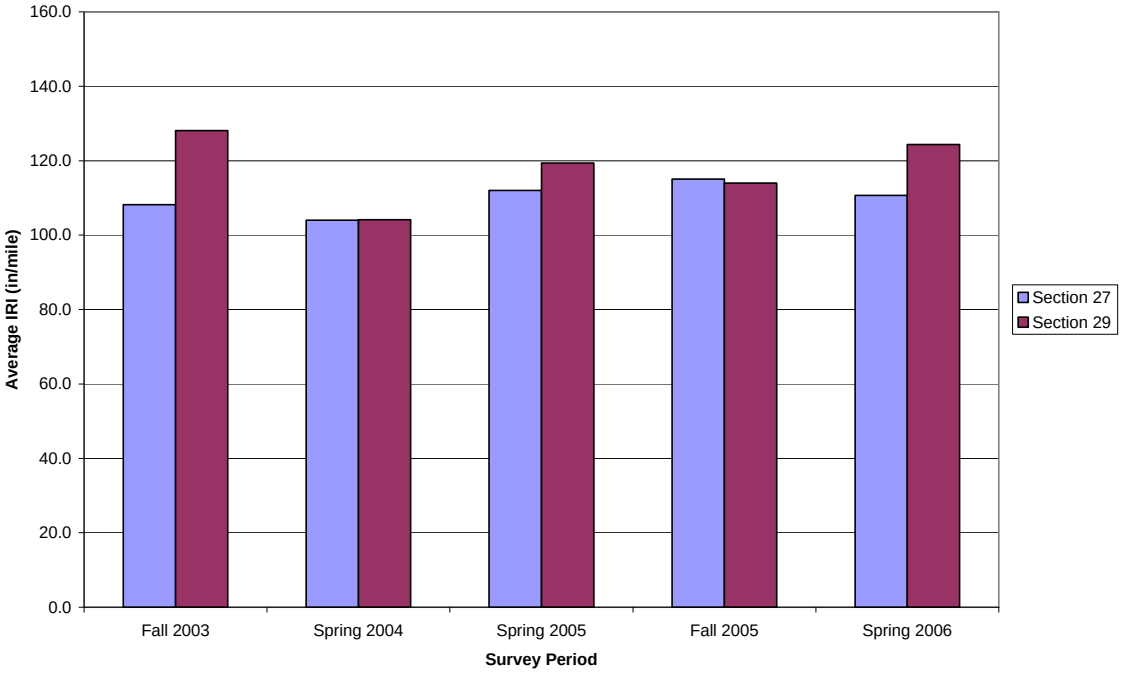

Figure F.9. IRI inside wheel path, 3.5” depth, scarify, no fibers, 6’ panel

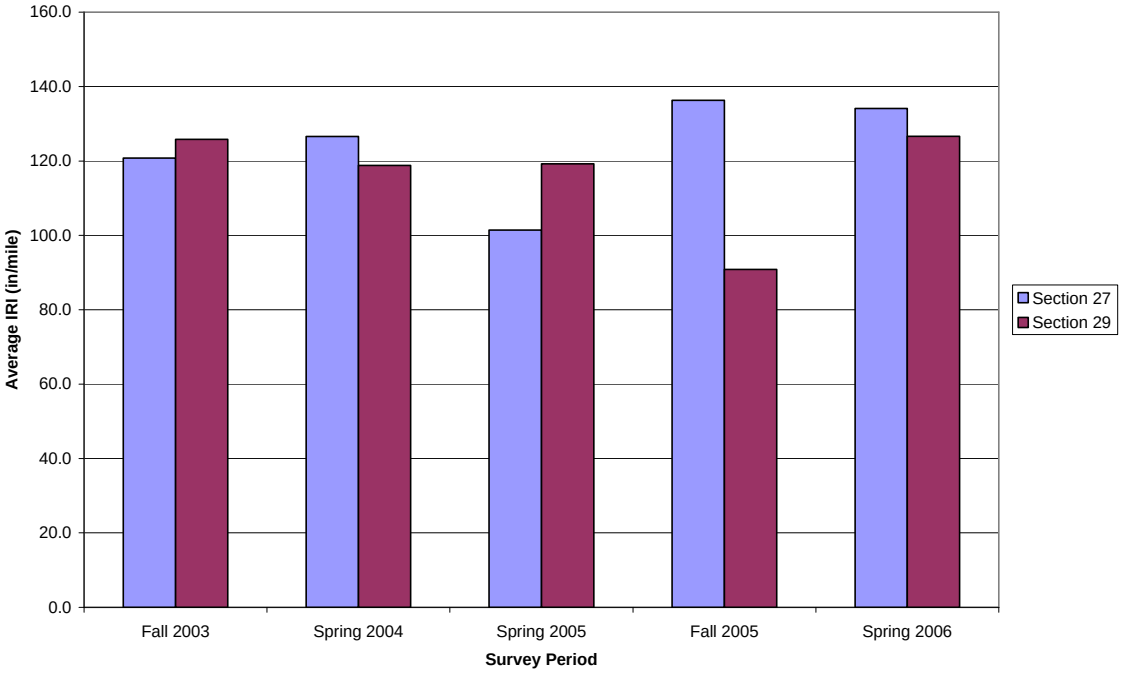

Figure F.10. IRI outside wheel path, 3.5” depth, scarify, no fibers, 6’ panel

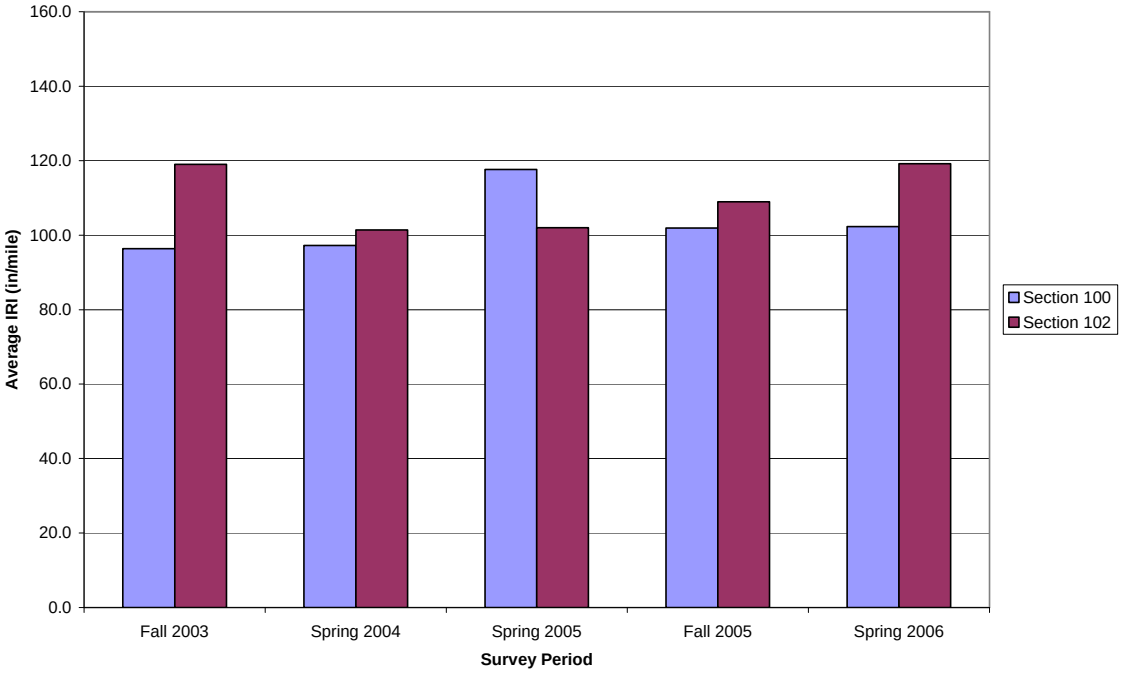

Figure F.11. IRI inside wheel path, 3.5” depth, HMA S. R., no fibers, 6’ panel

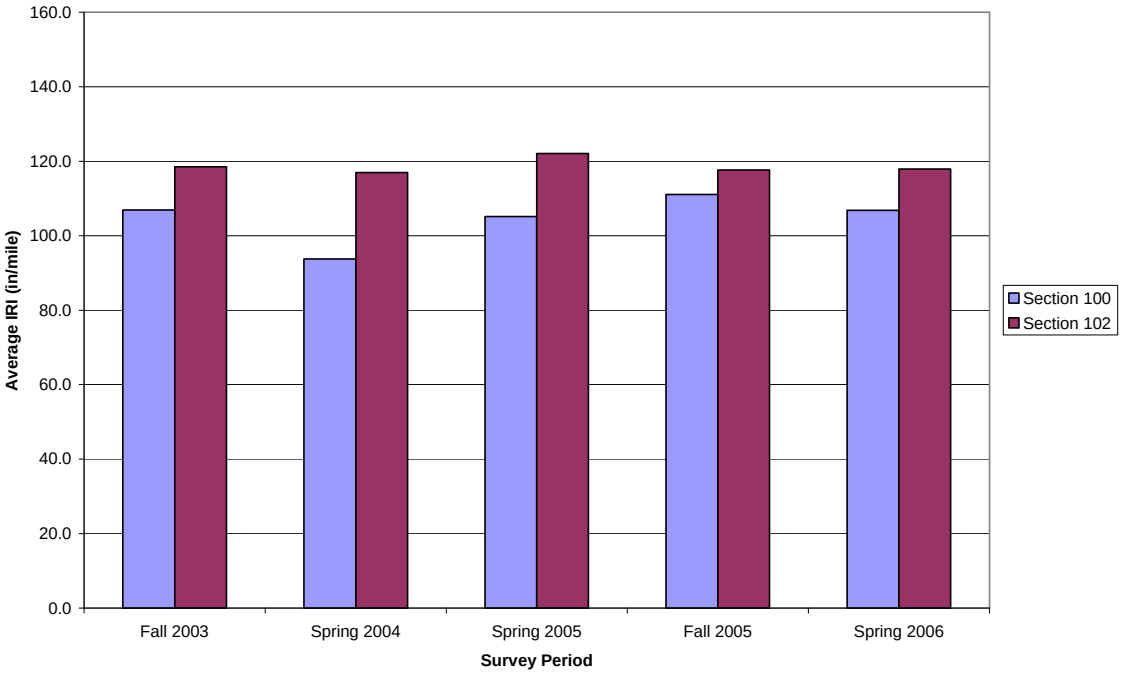

Figure F.12. IRI outside wheel path, 3.5” depth, HMA S. R., no fibers, 6’ panel

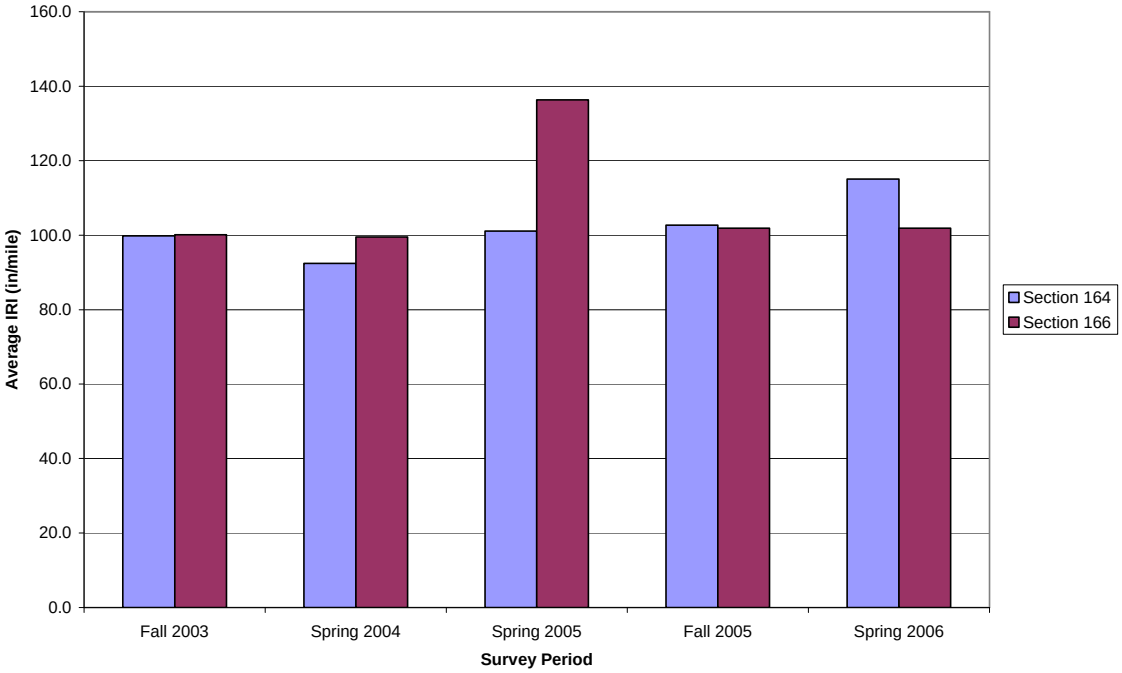

Figure F.13. IRI inside wheel path, 3.5” depth, patch, no fibers, 6’ panel

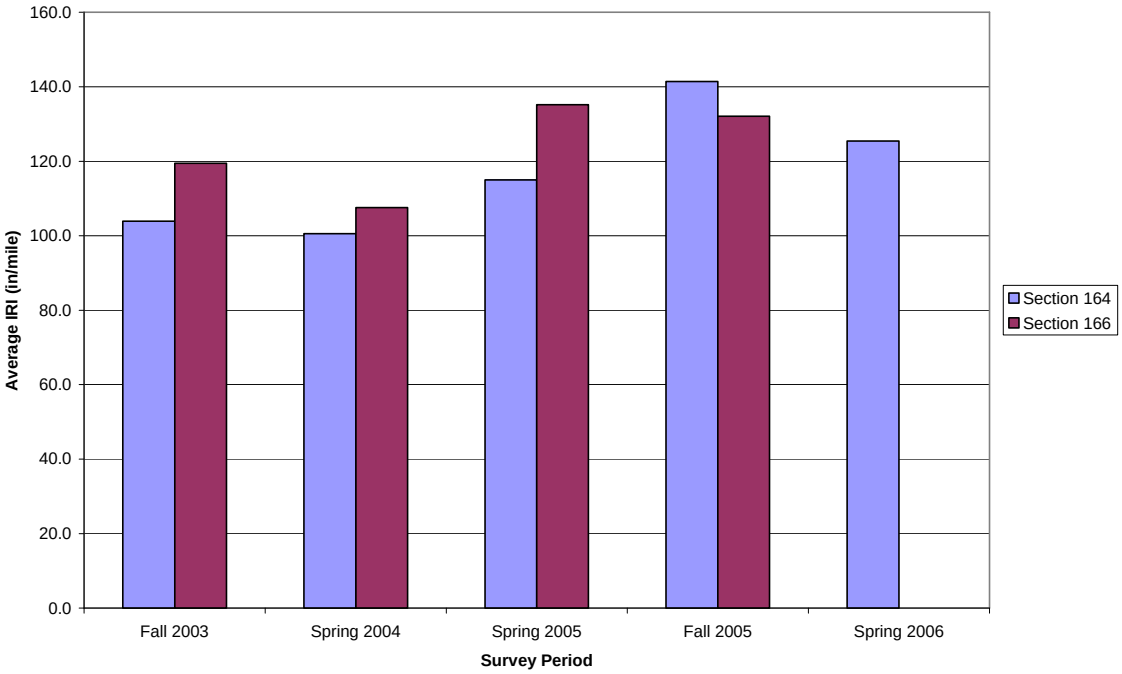

Figure F.14. IRI outside wheel path, 3.5” depth, patch, no fibers, 6’ panel

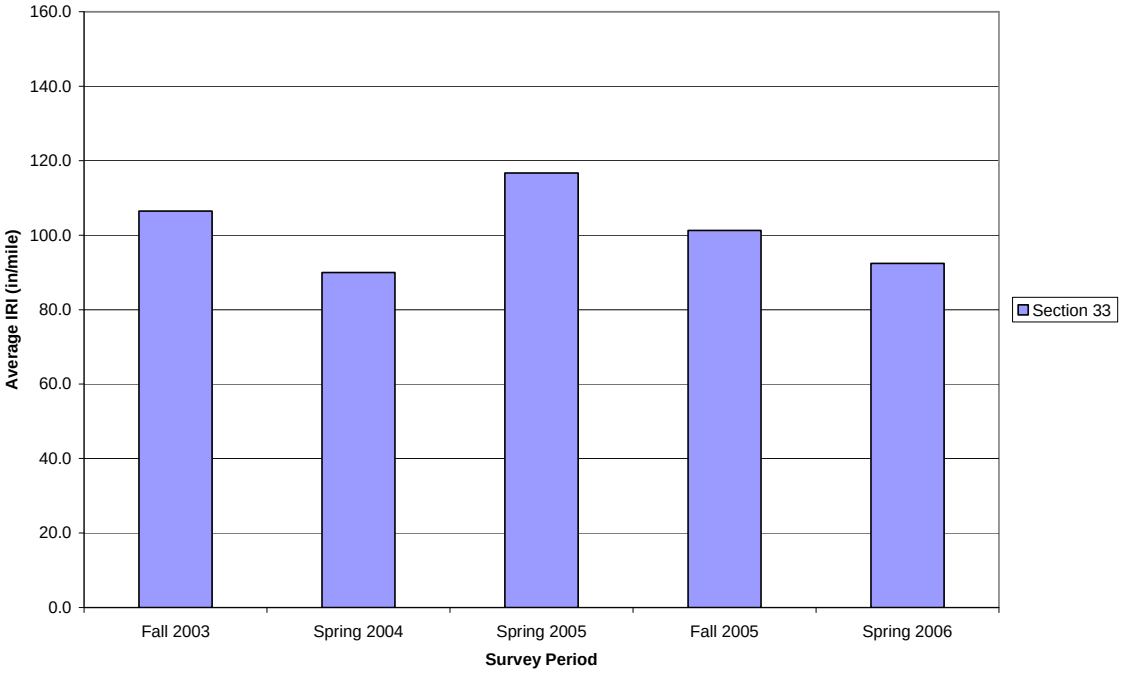

Figure F.15. IRI inside wheel path, 3.5” depth, scarify, fiber A, 4.5’ panel

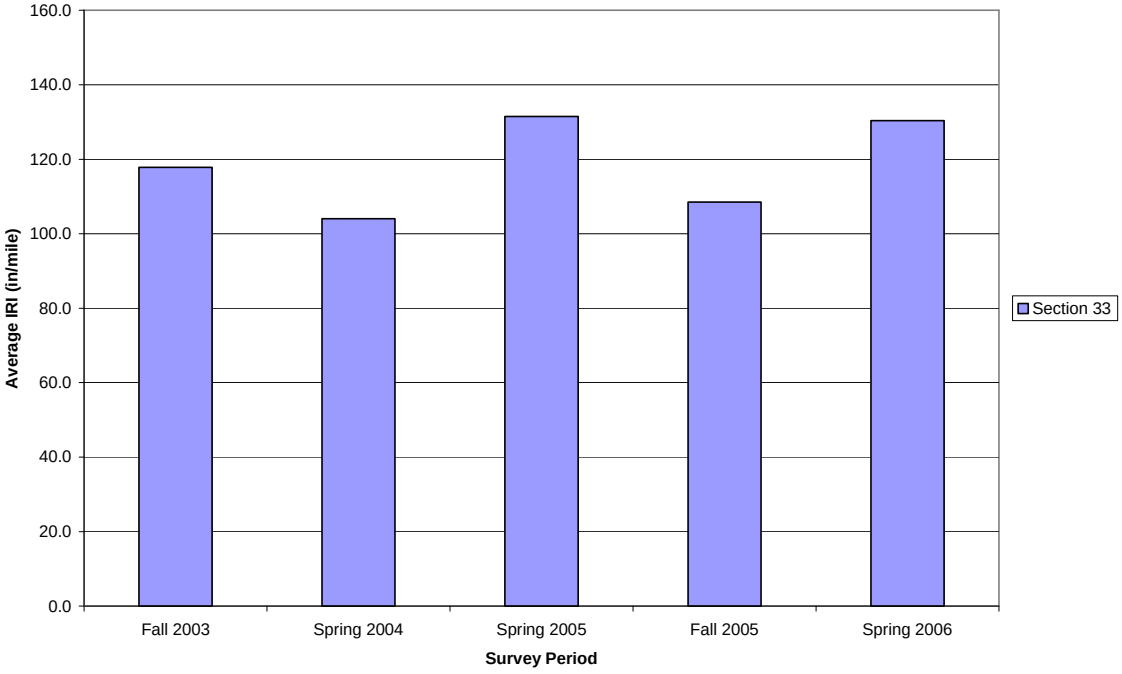

Figure F.16. IRI outside wheel path, 3.5” depth, scarify, fiber A, 4.5’ panel

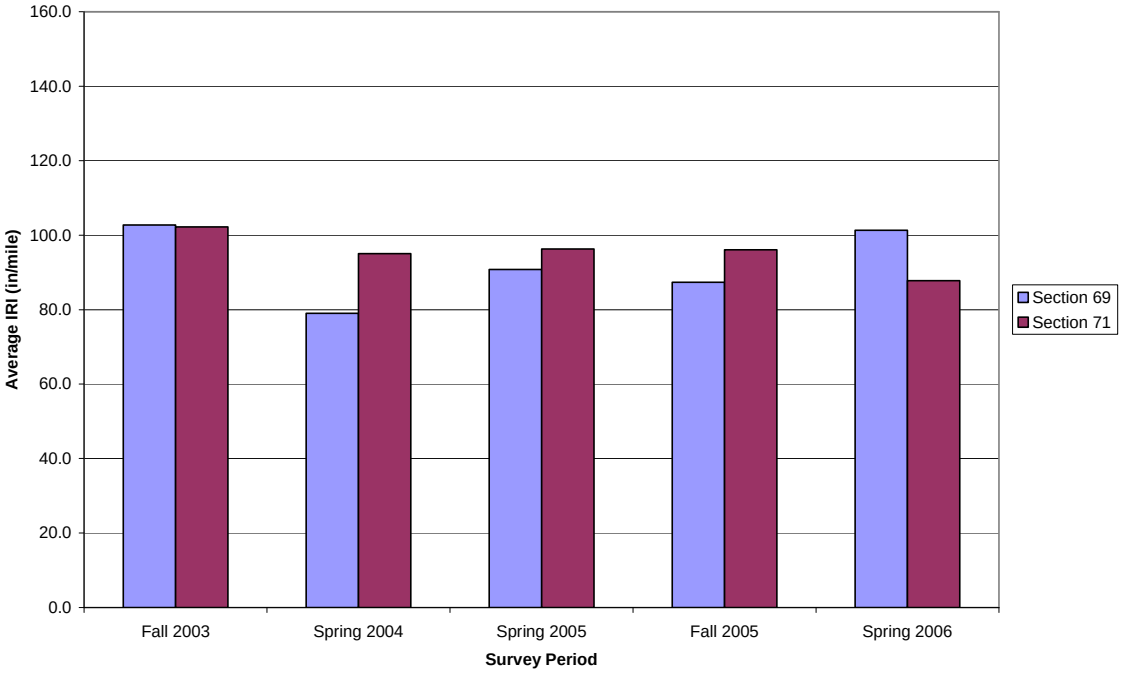

Figure F.17. IRI inside wheel path, 3.5" depth, HMA S. R., fiber A, 4.5' panel

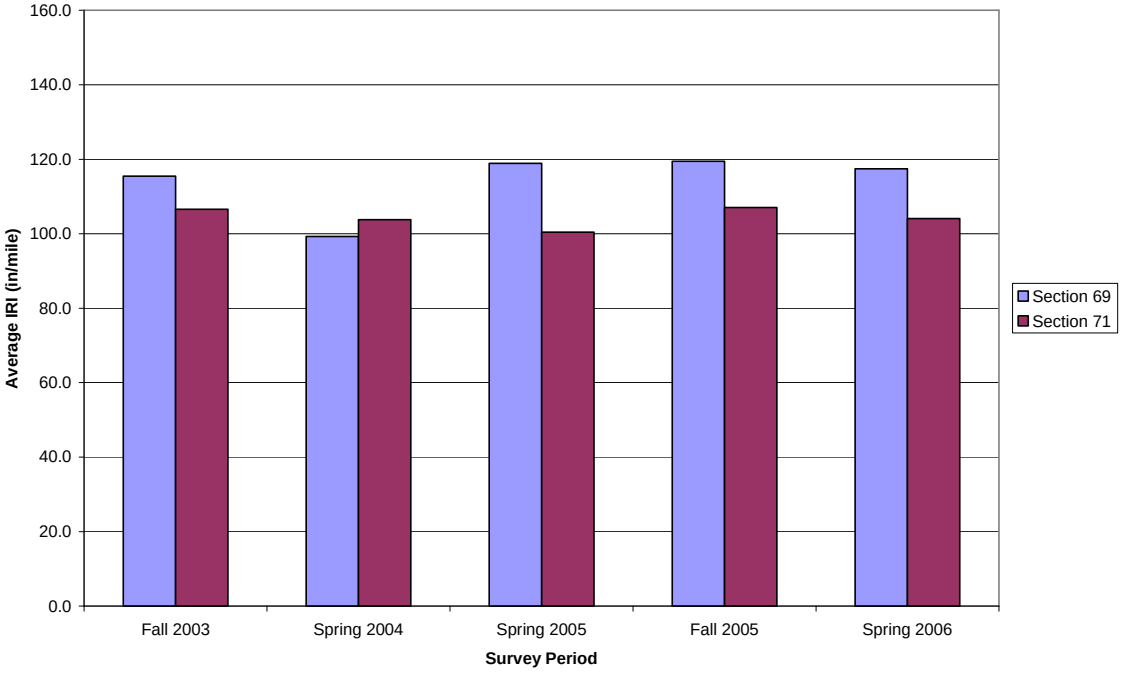

Figure F.18. IRI outside wheel path, 3.5" depth, HMA S. R., fiber A, 4.5' panel

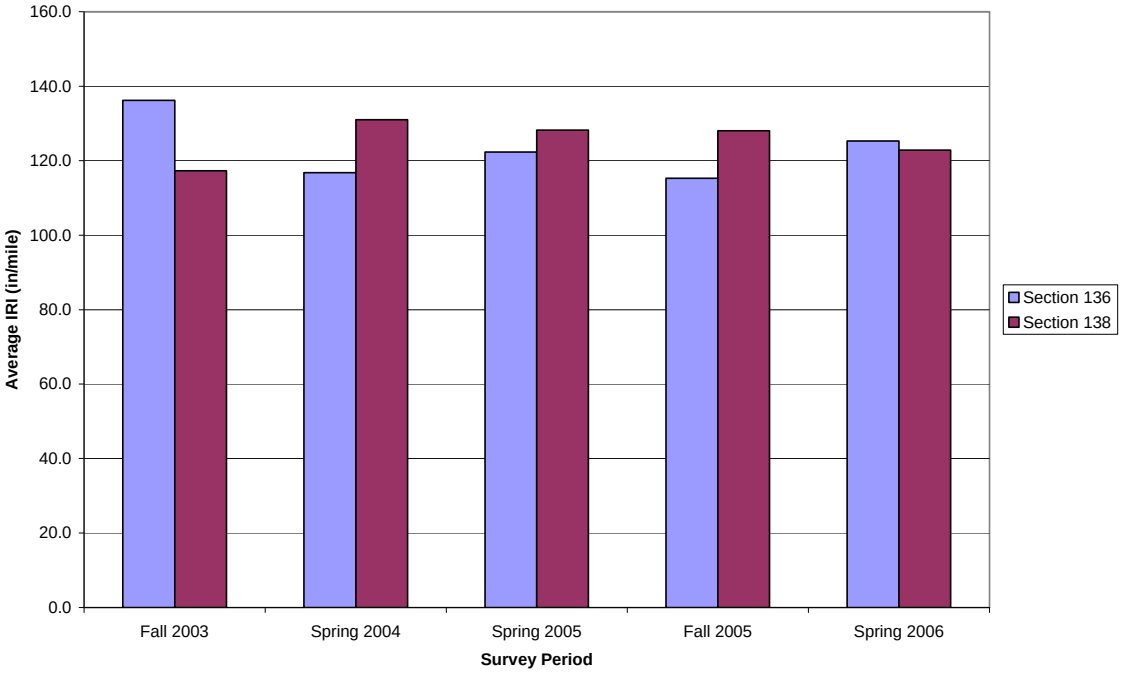

Figure F.19. IRI inside wheel path, 3.5” depth, patch, fiber A, 4.5’ panel

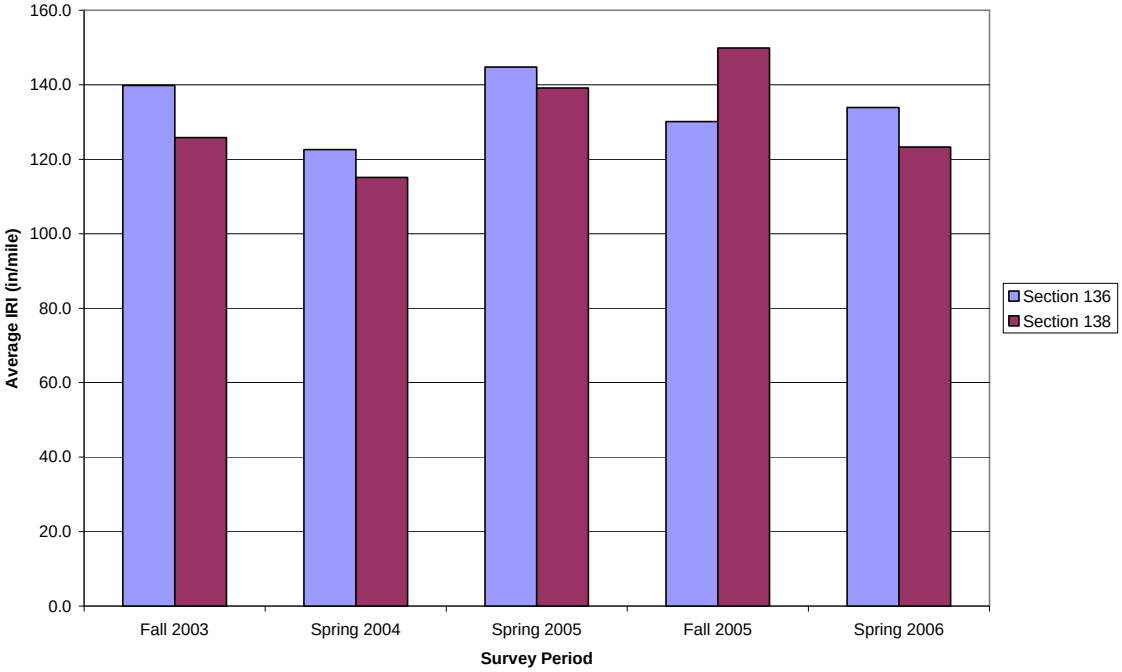

Figure F.20. IRI outside wheel path, 3.5” depth, patch, fiber A, 4.5’ panel

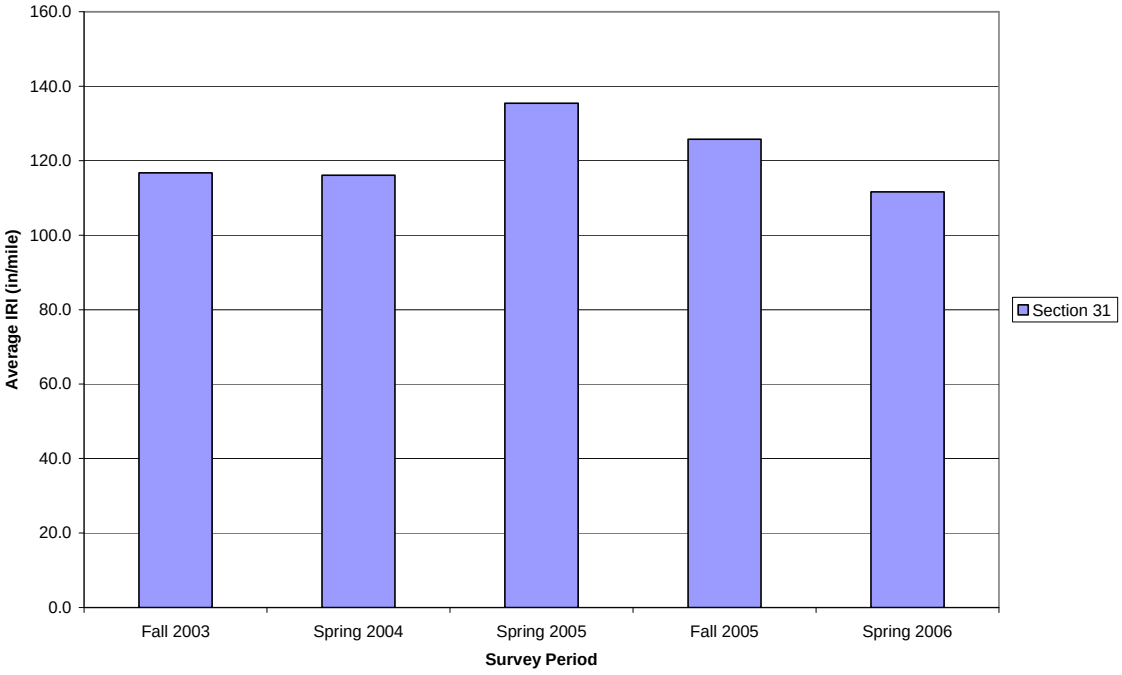

Figure F.21. IRI inside wheel path, 3.5” depth, scarify, fiber A, 6’ panel

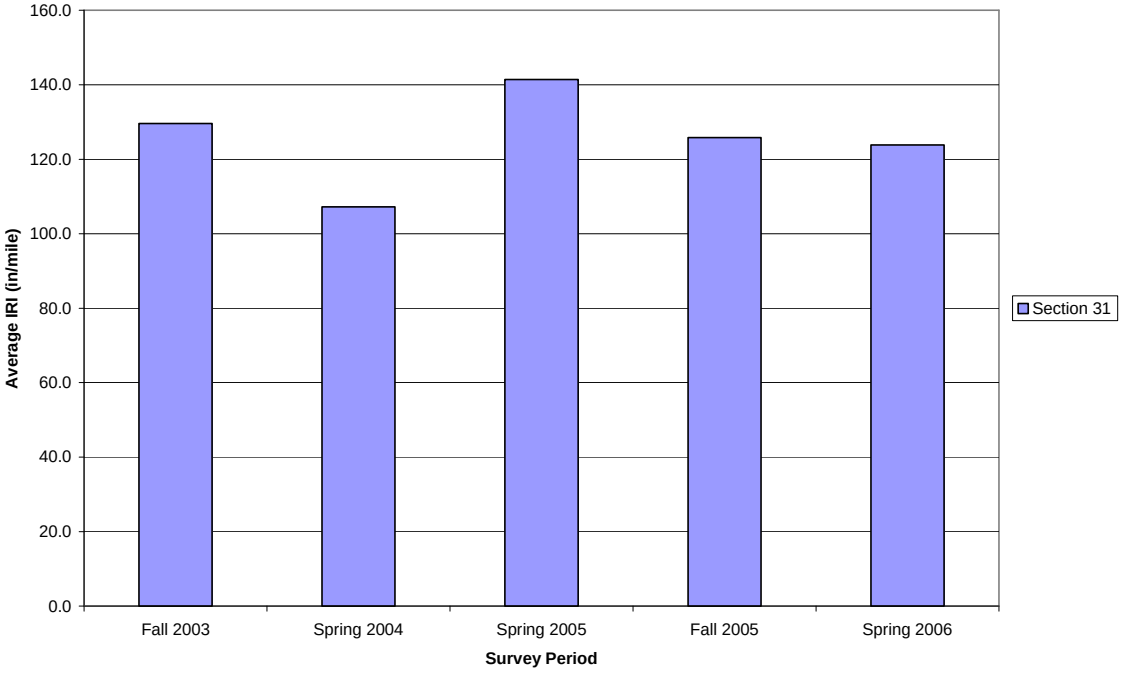

Figure F.22. IRI outside wheel path, 3.5” depth, scarify, fiber A, 6’ panel

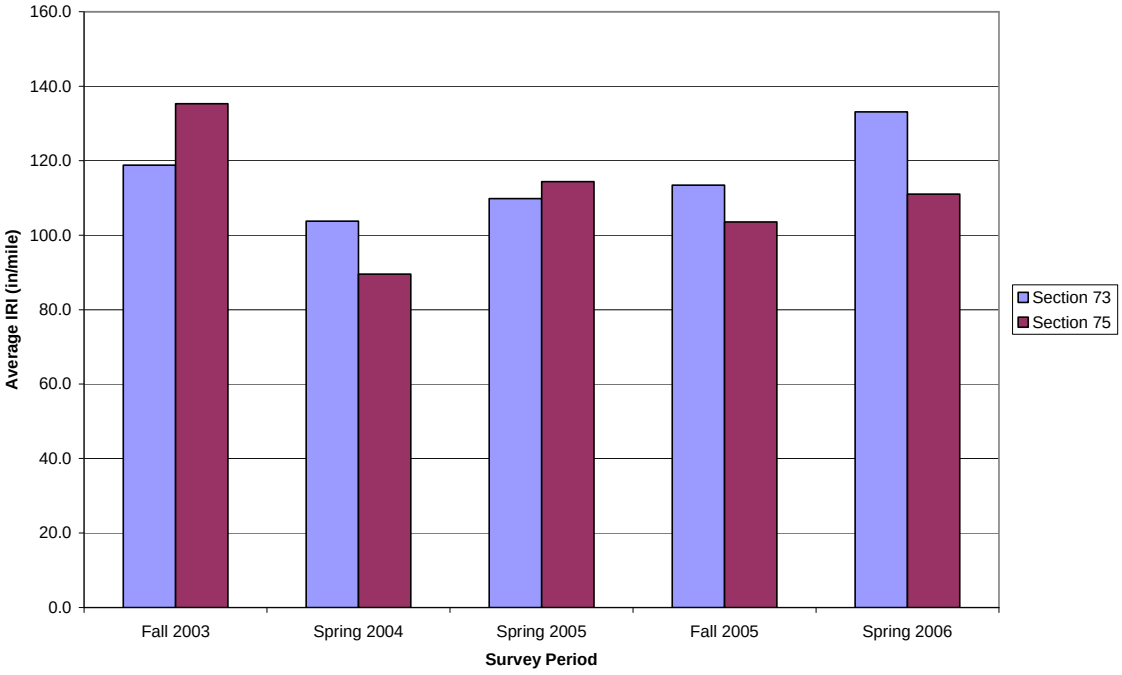

Figure F.23. IRI inside wheel path, 3.5” depth, HMA S. R., fiber A, 6’ panel

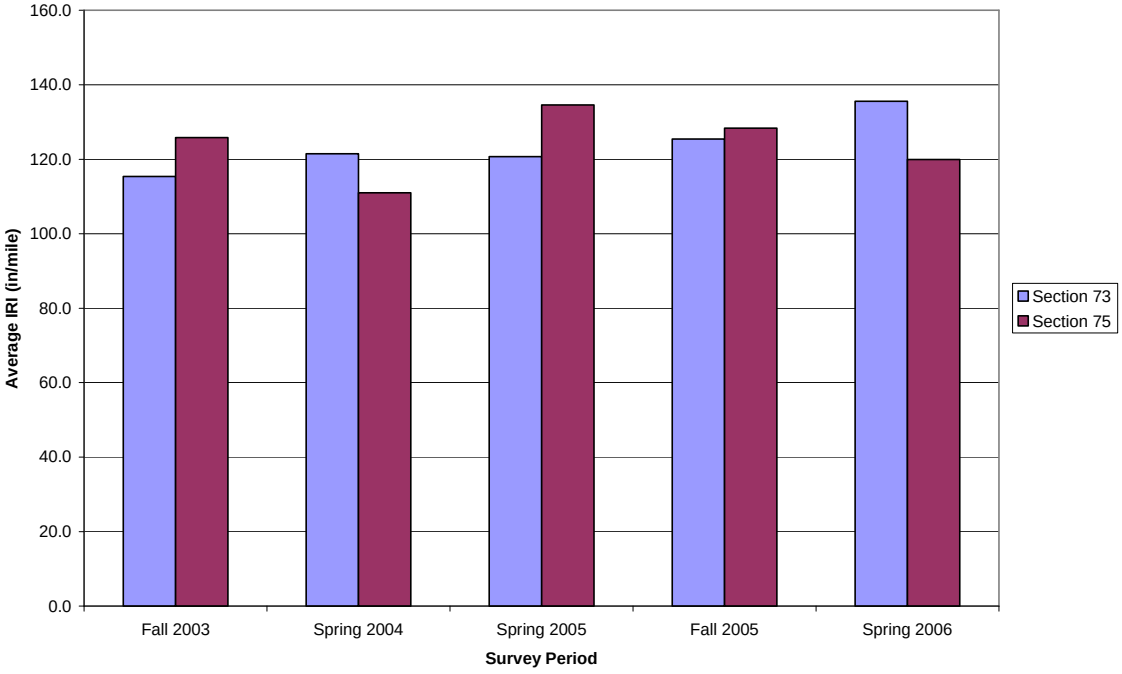

Figure F.24. IRI outside wheel path, 3.5” depth, HMA S. R., fiber A, 6’ panel

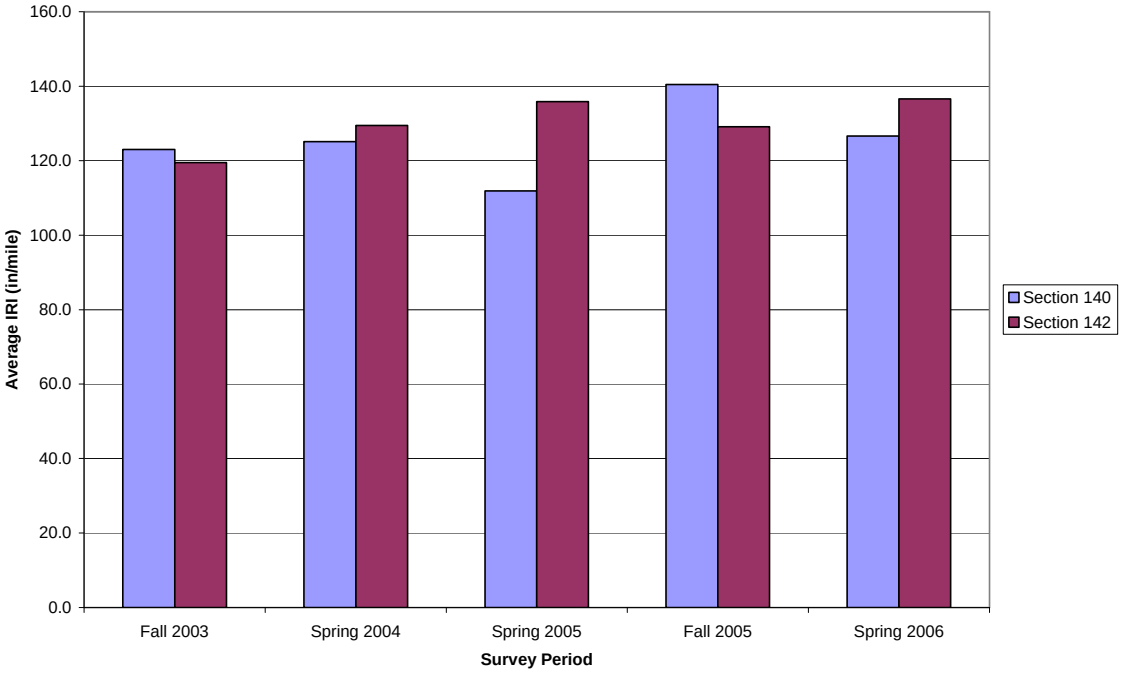

Figure F.25. IRI inside wheel path, 3.5” depth, patch, fiber A, 6’ panel

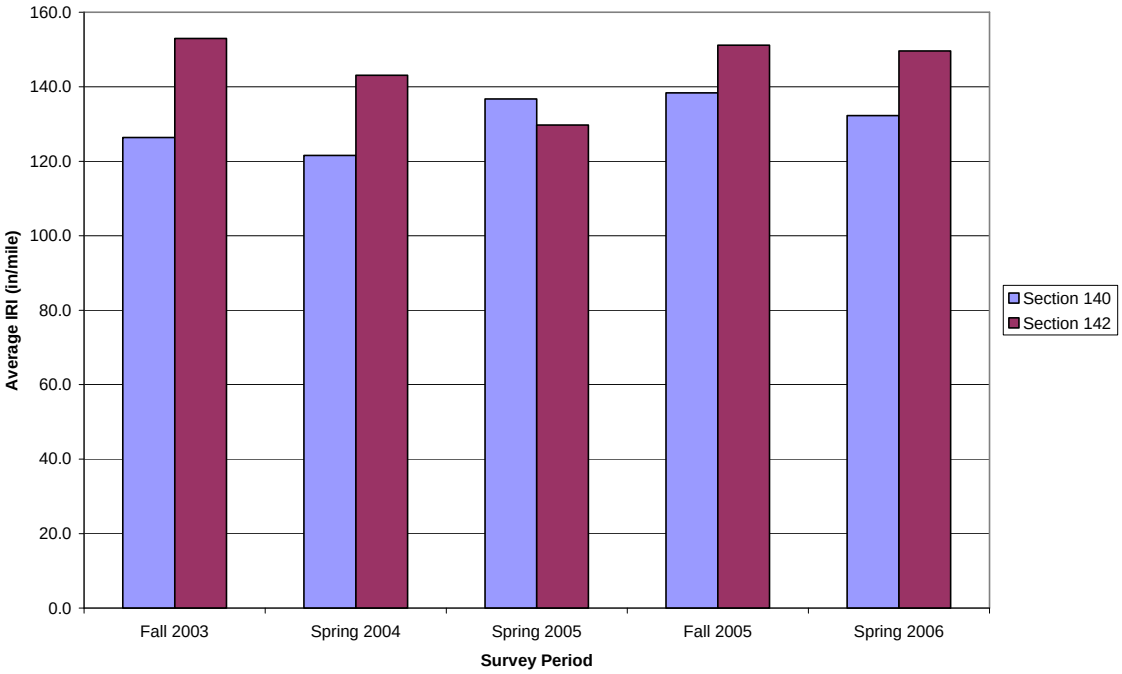

Figure F.26. IRI outside wheel path, 3.5” depth, patch, fiber A, 6’ panel

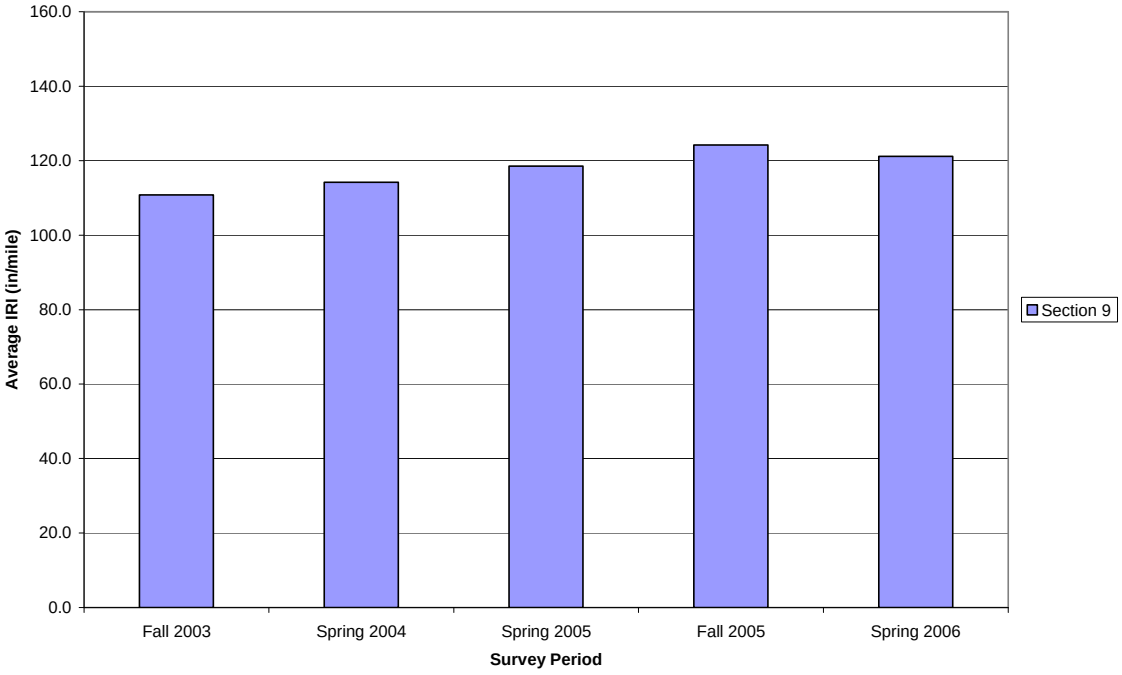

Figure F.27. IRI inside wheel path, 3.5” depth, scarify, fiber B, 4.5’ panel

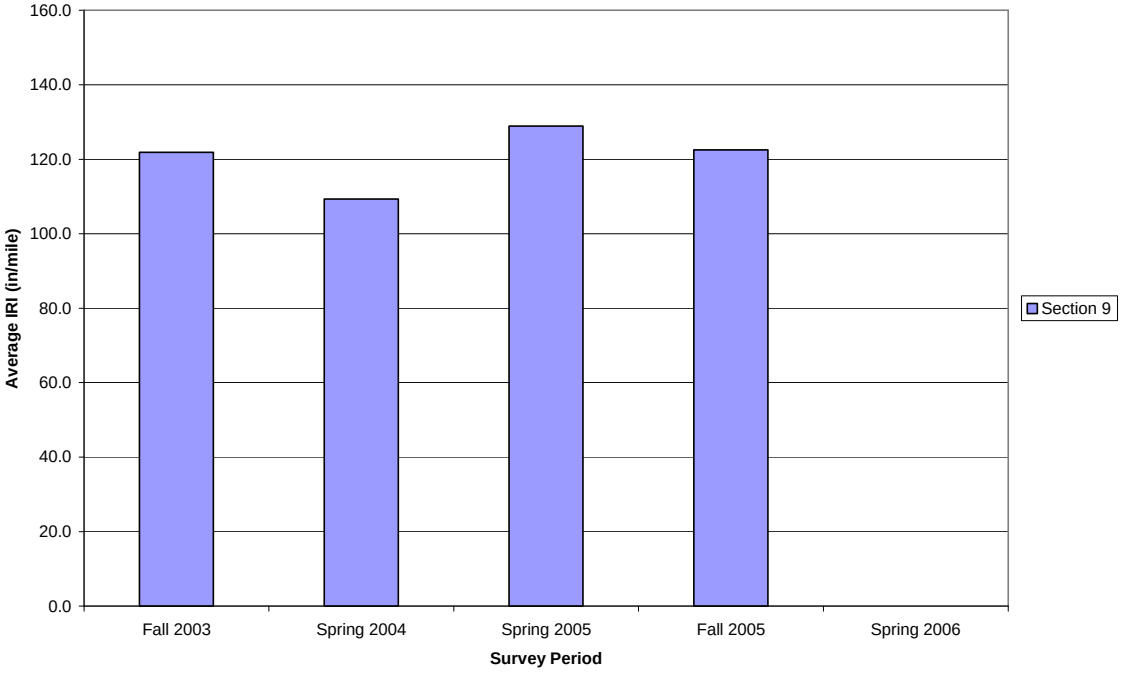

Figure F.28. IRI outside wheel path, 3.5” depth, scarify, fiber B, 4.5’ panel

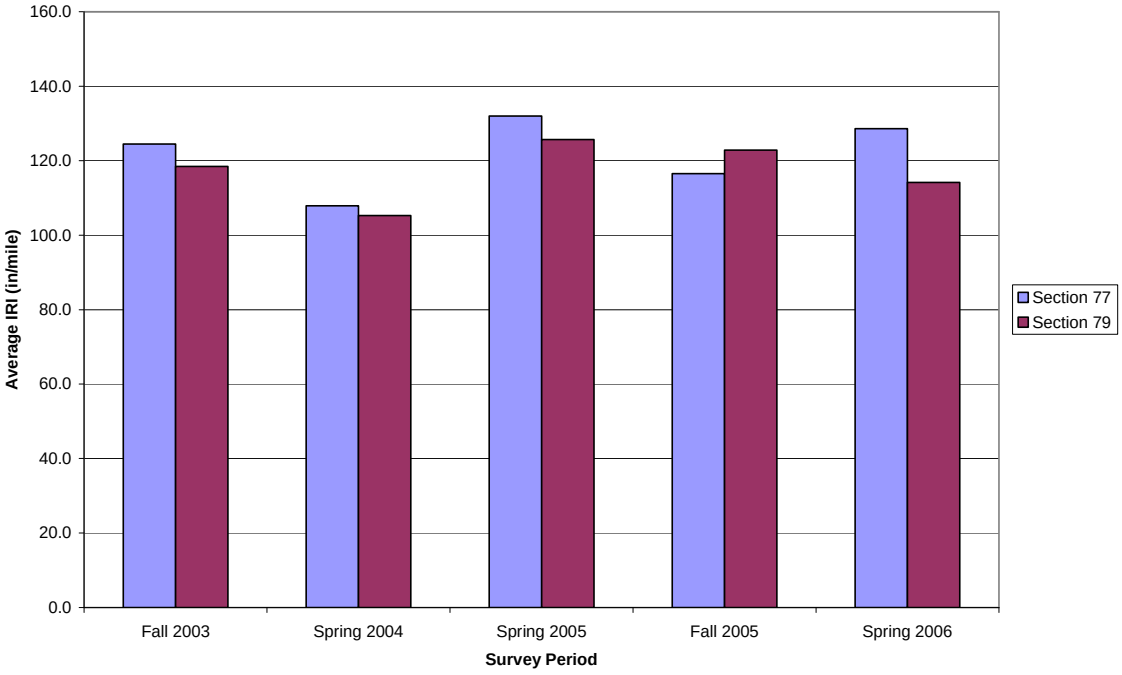

Figure F.29. IRI inside wheel path, 3.5" depth, HMA S. R., fiber B, 4.5' panel

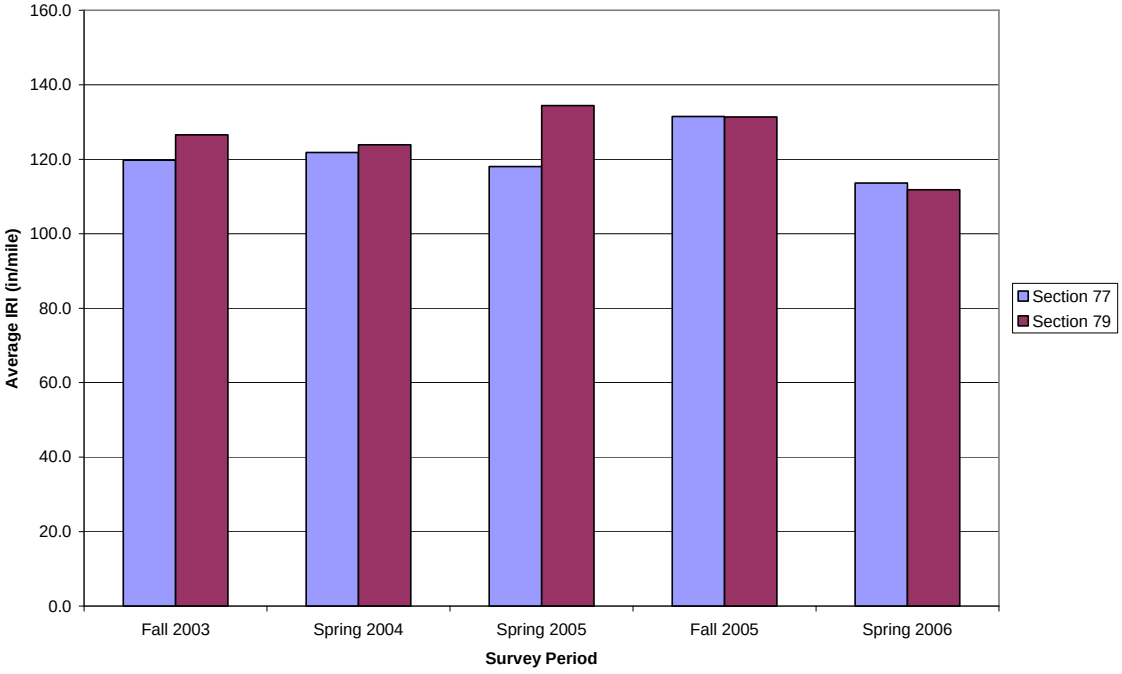

Figure F.30. IRI outside wheel path, 3.5" depth, HMA S. R., fiber B, 4.5' panel

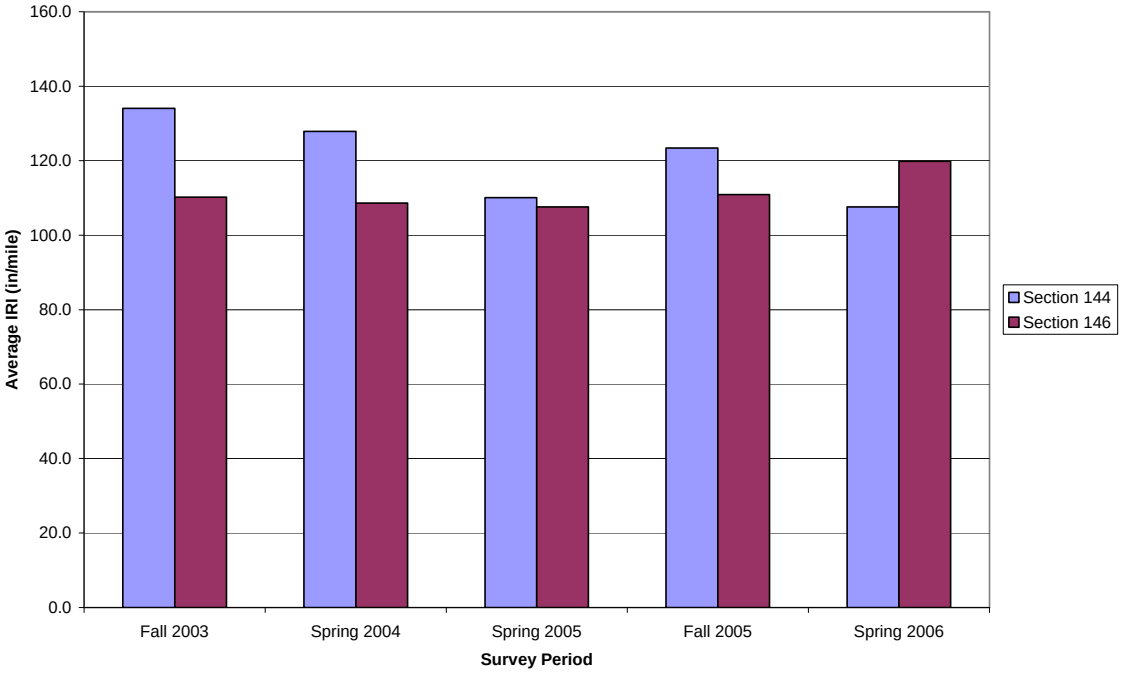

Figure F.31. IRI inside wheel path, 3.5” depth, patch, fiber B, 4.5’ panel

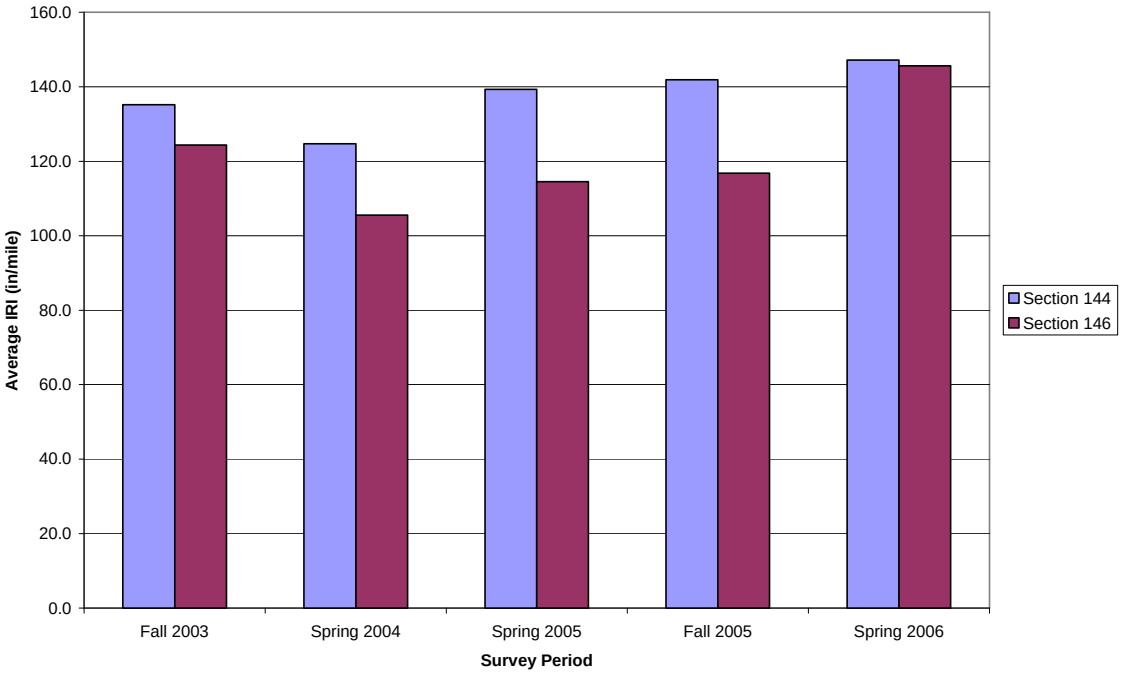

Figure F.32. IRI outside wheel path, 3.5” depth, patch, fiber B, 4.5’ panel

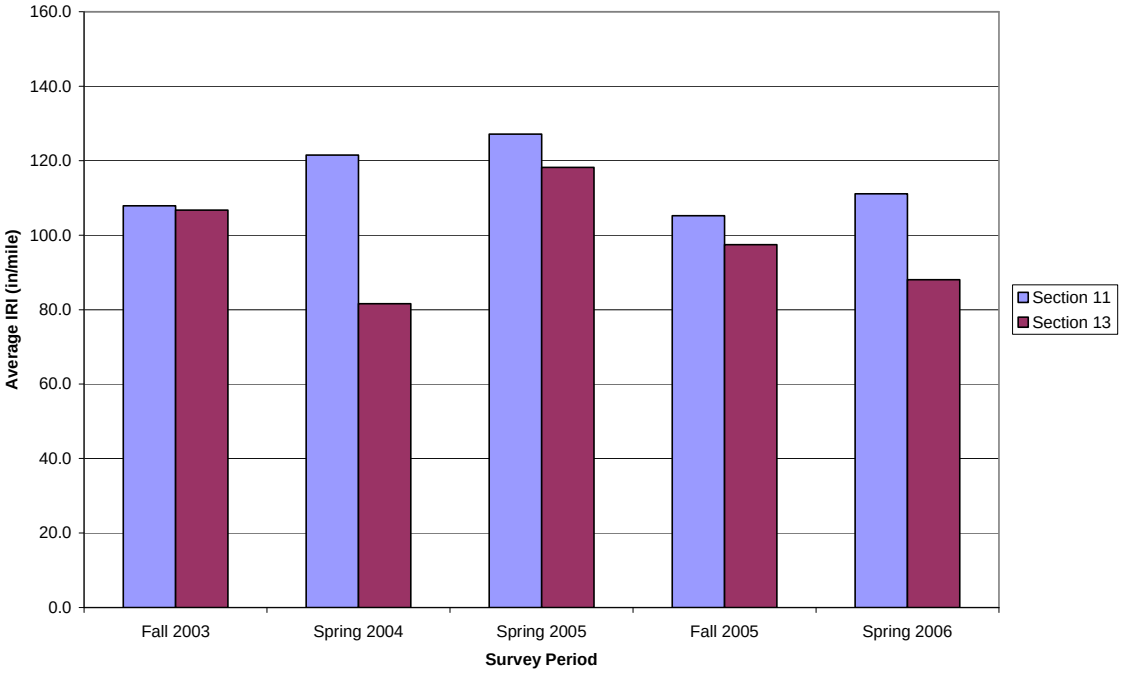

Figure F.33. IRI inside wheel path, 3.5” depth, scarify, fiber B, 6’ panel

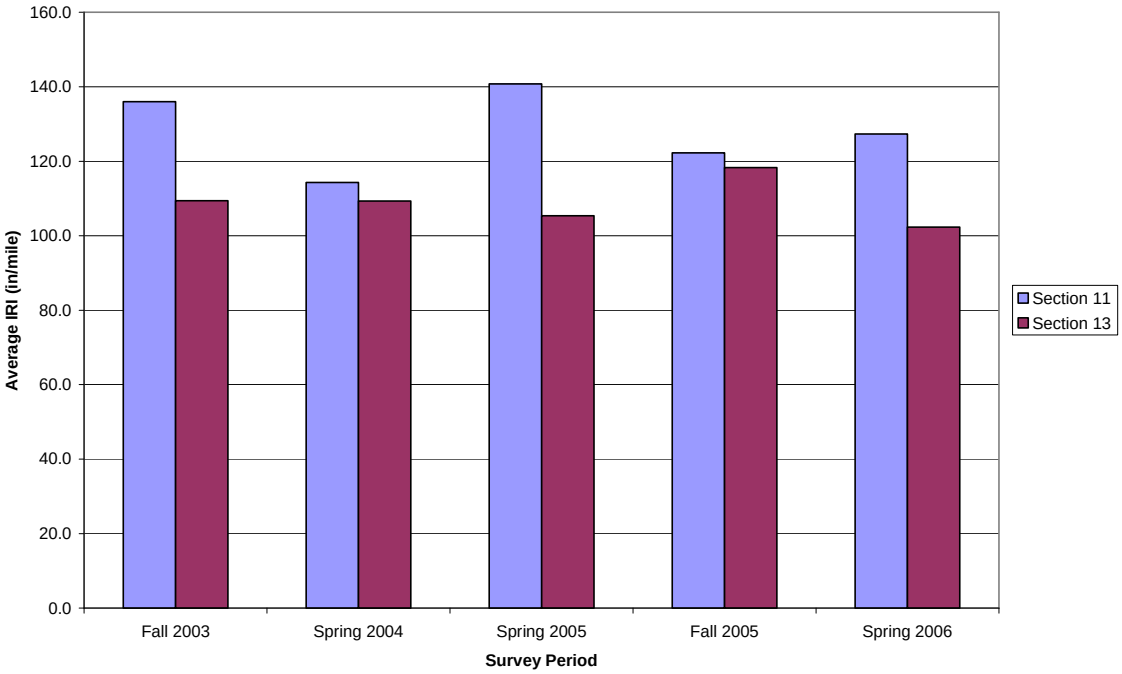

Figure F.34. IRI outside wheel path, 3.5” depth, scarify, fiber B, 6’ panel

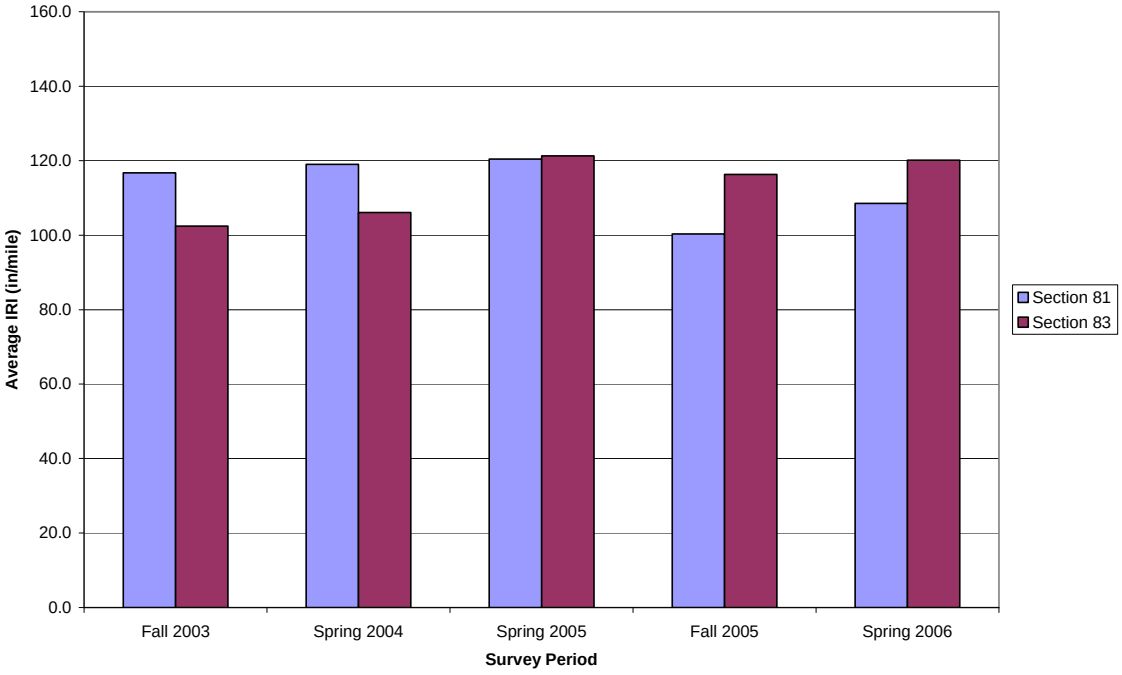

Figure F.35. IRI inside wheel path, 3.5” depth, HMA S. R., fiber B, 6’ panel

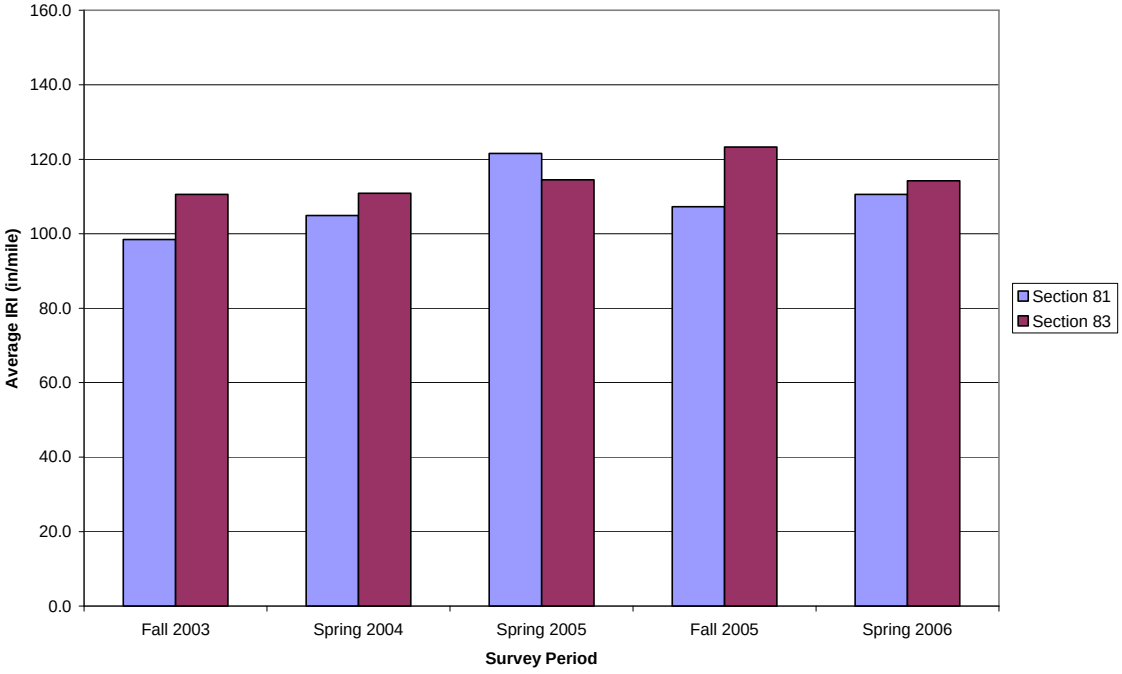

Figure F.36. IRI outside wheel path, 3.5” depth, HMA S. R., fiber B, 6’ panel

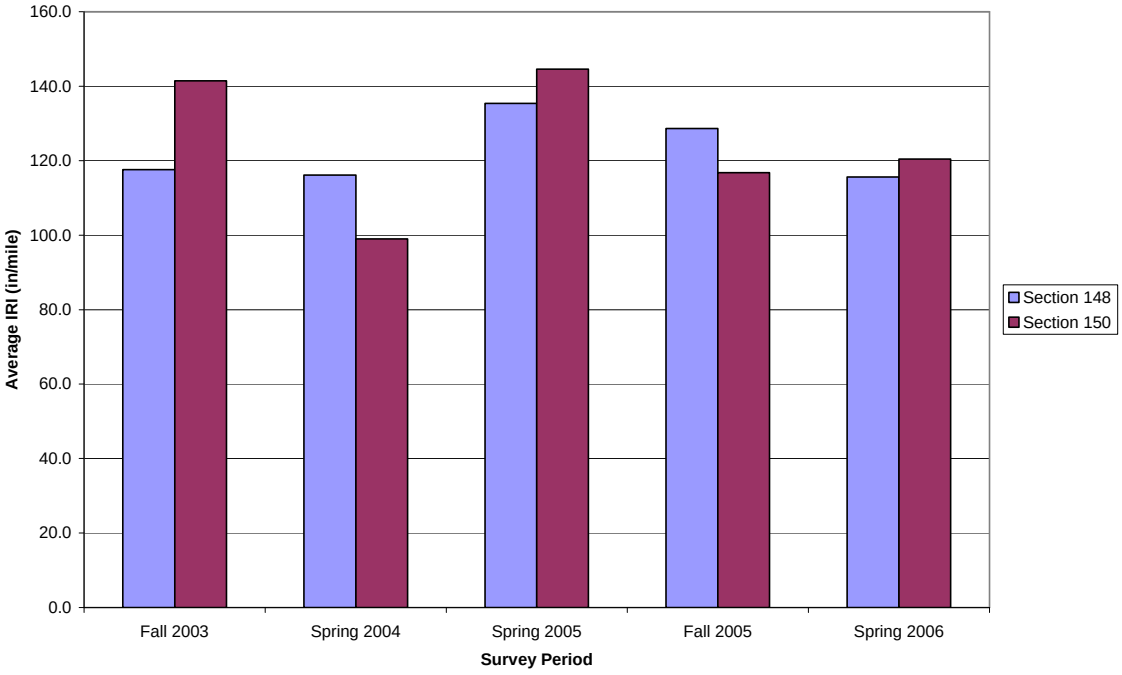

Figure F.37. IRI inside wheel path, 3.5” depth, patch, fiber B, 6’ panel

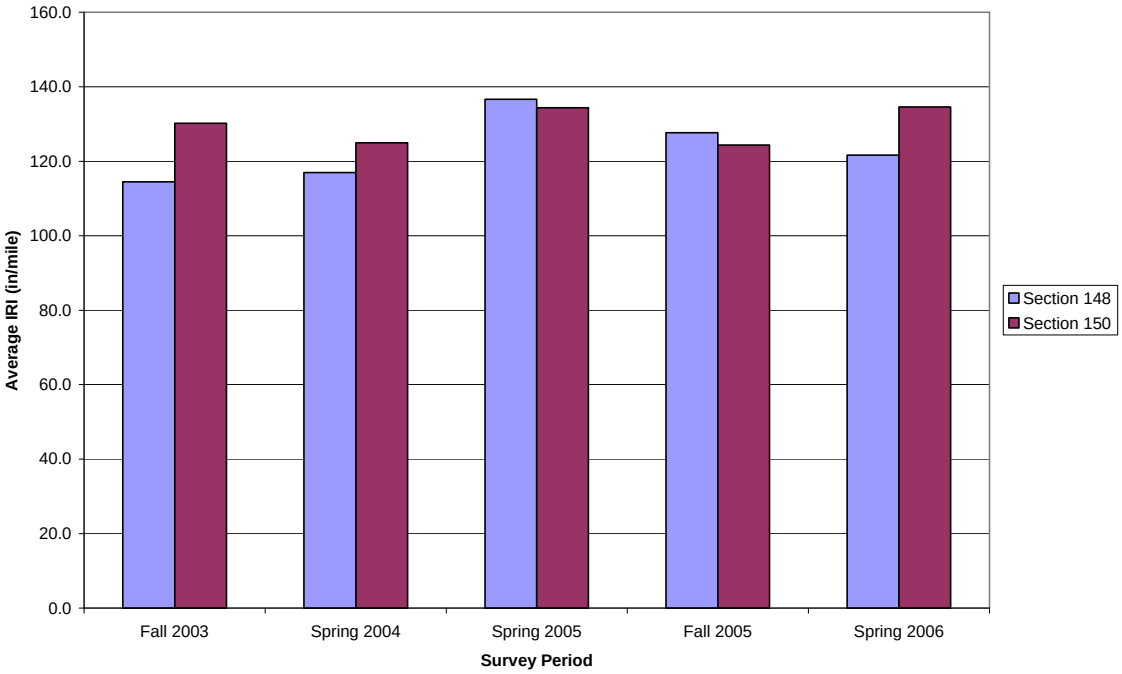

Figure F.38. IRI outside wheel path, 3.5” depth, patch, fiber B, 6’ panel

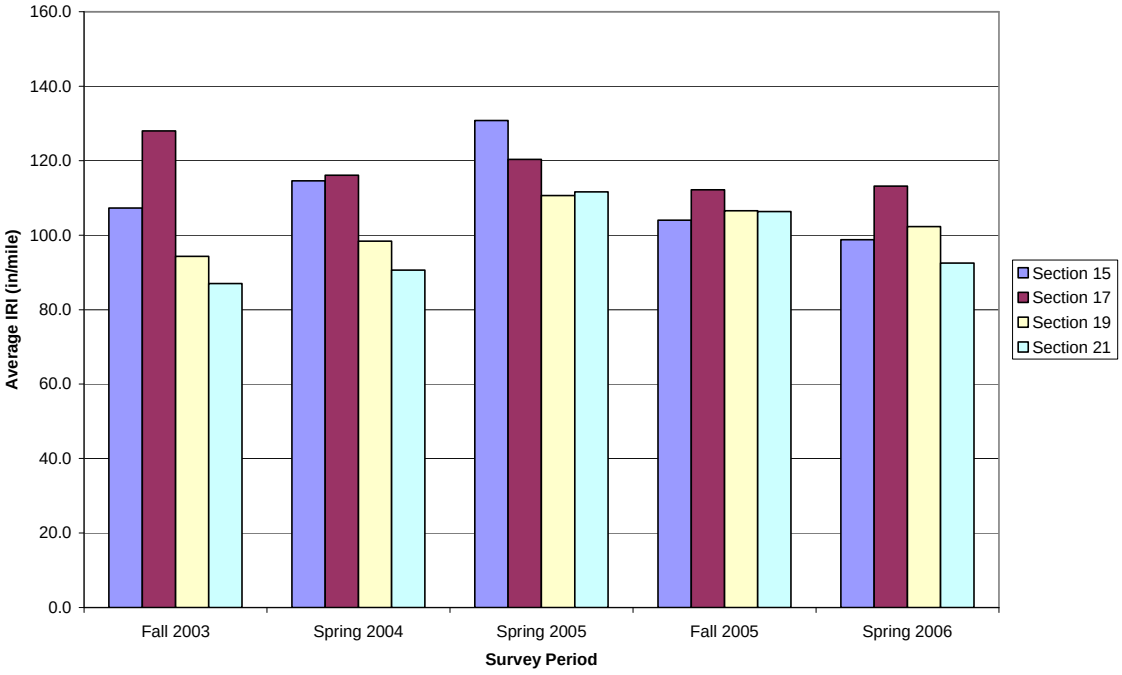

Figure F.39. IRI inside wheel path, 3.5” depth, scarify, fiber C, 6’ panel

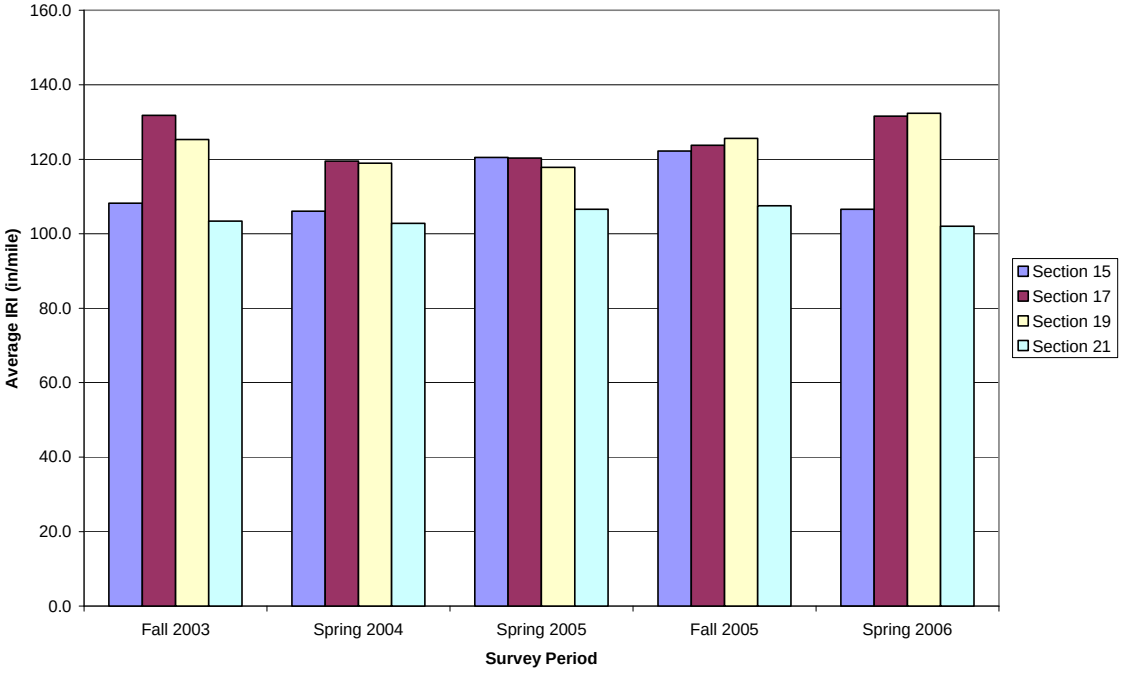

Figure F.40. IRI outside wheel path, 3.5” depth, scarify, fiber C, 6’ panel

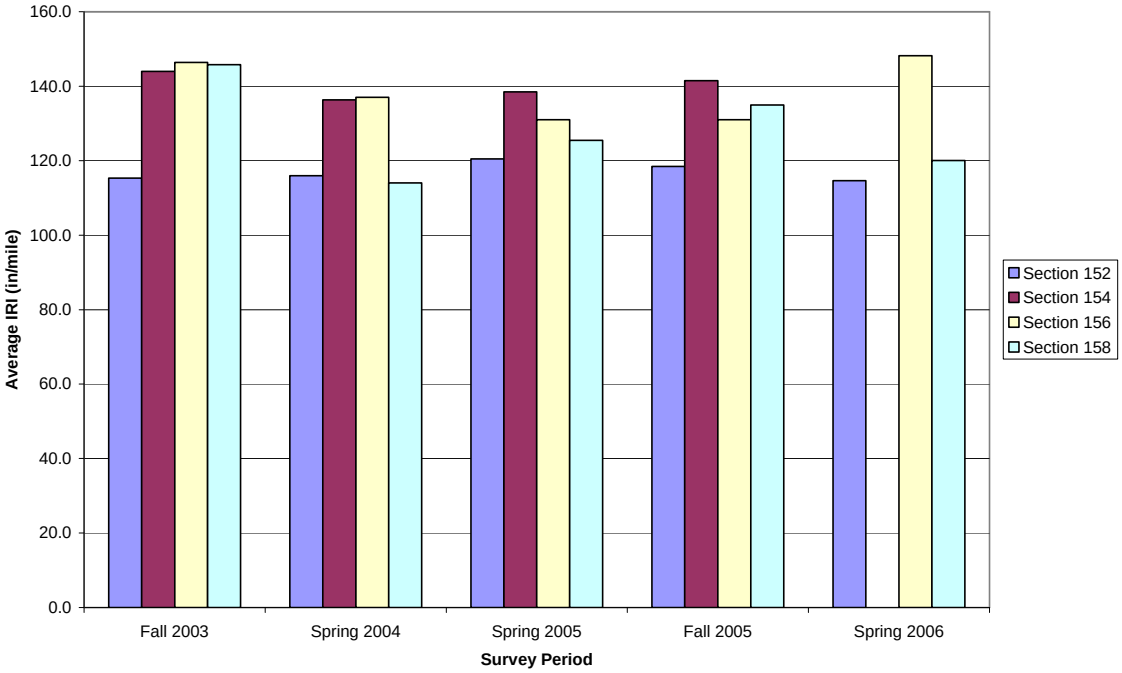

Figure F.41. IRI inside wheel path, 3.5” depth, patch, fiber C, 6’ panel

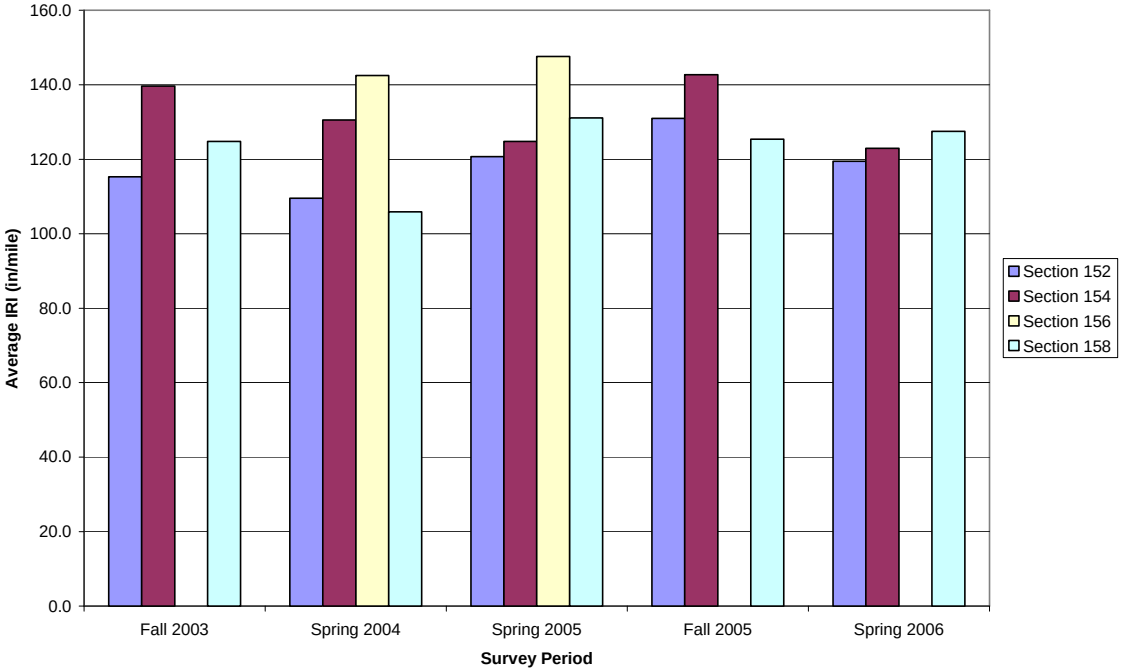

Figure F.42. IRI outside wheel path, 3.5” depth, patch, fiber C, 6’ panel

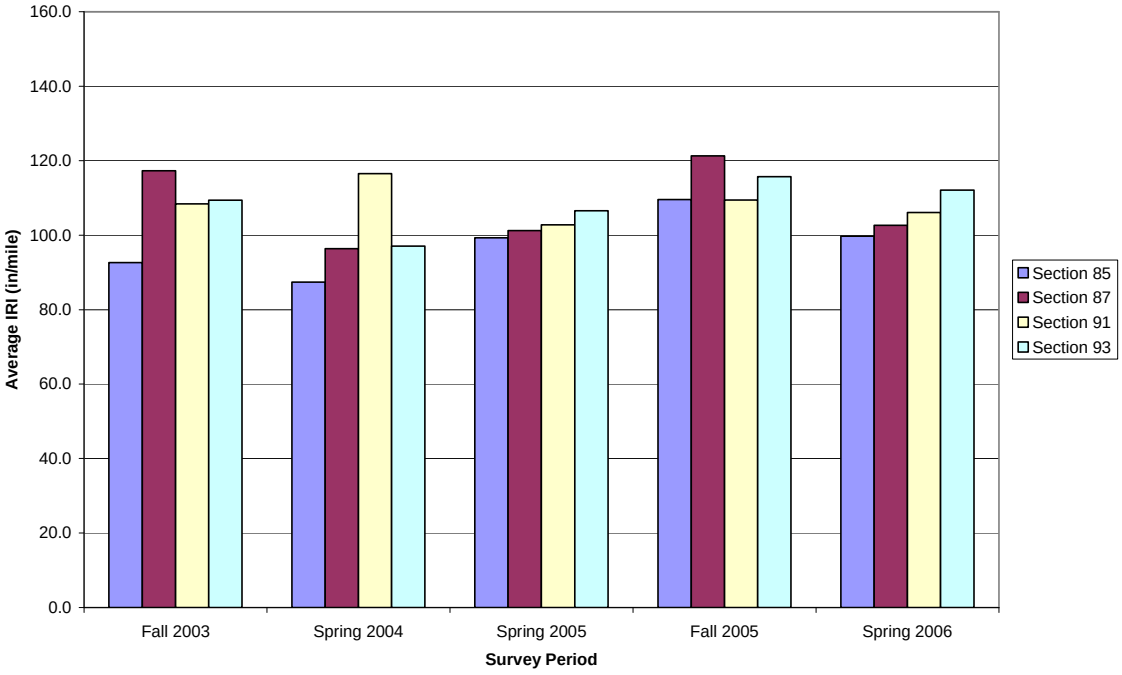

Figure F.43. IRI inside wheel path, 3.5” depth, HMA S. R., fiber C, 9’ panel

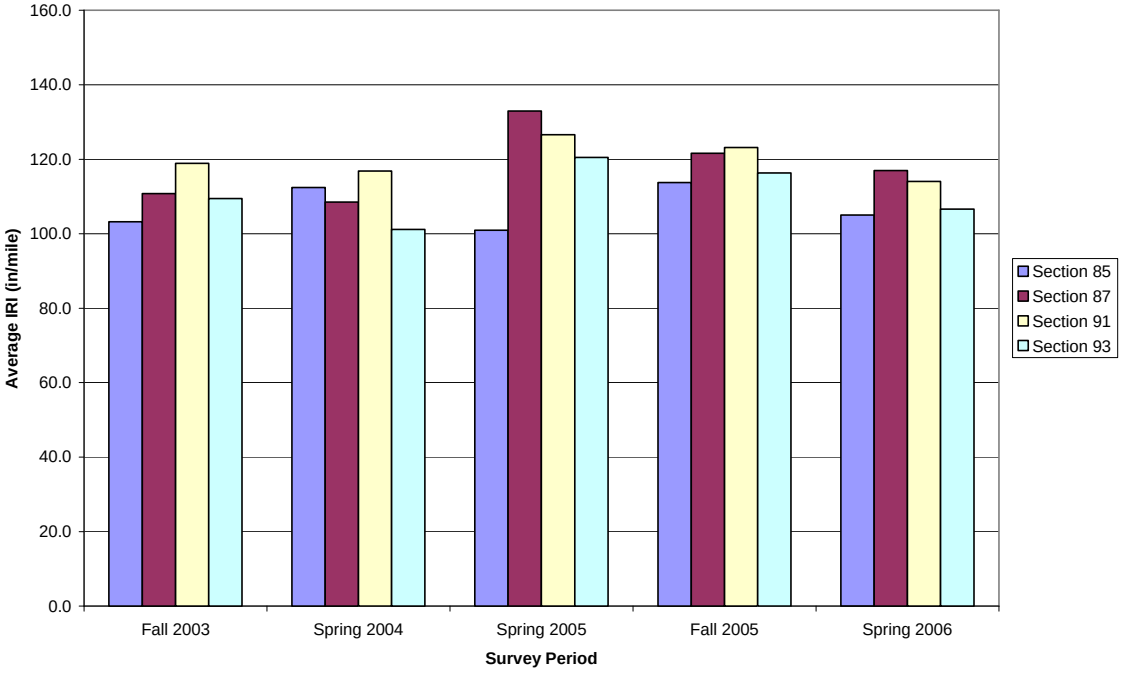

Figure F.44. IRI outside wheel path, 3.5” depth, HMA S. R., fiber C, 9’ panel

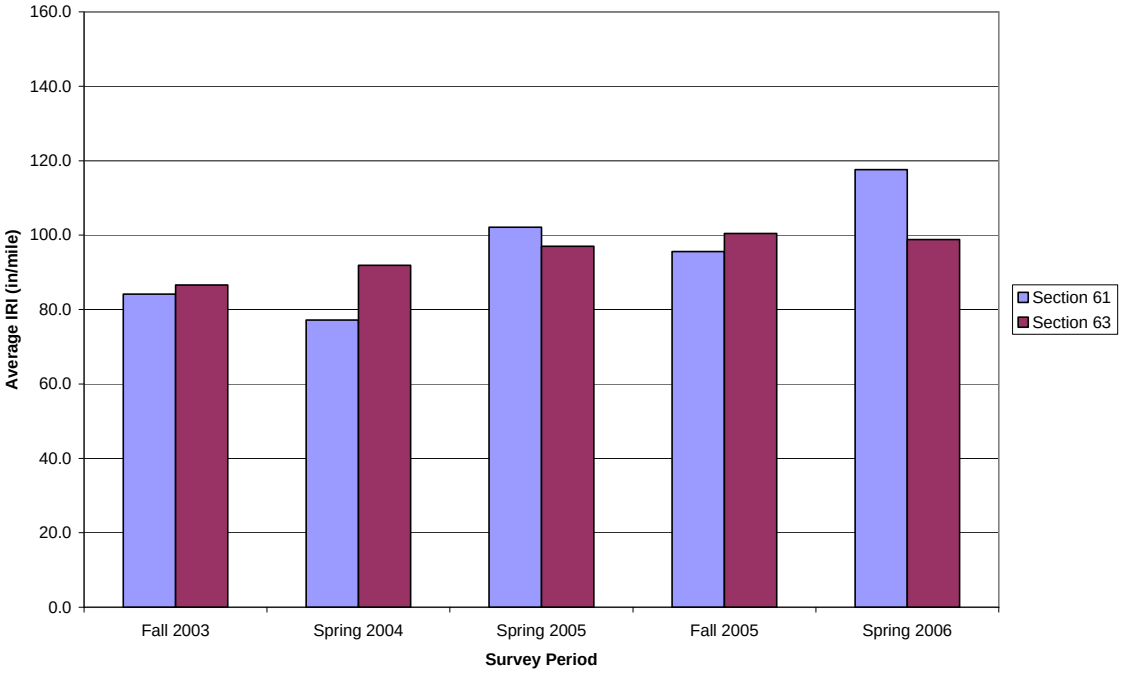

Figure F.45. IRI inside wheel path, 4.5” depth, scarify, no fibers, 4.5’ panel

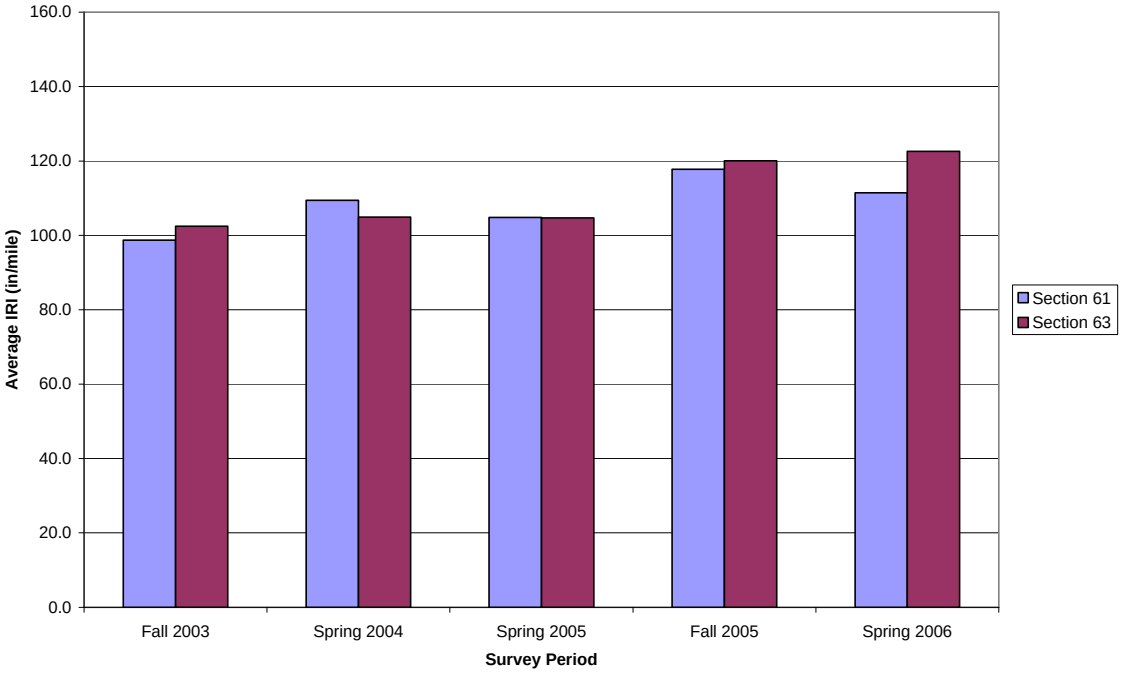

Figure F.46. IRI outside wheel path, 4.5” depth, scarify, no fibers, 4.5’ panel

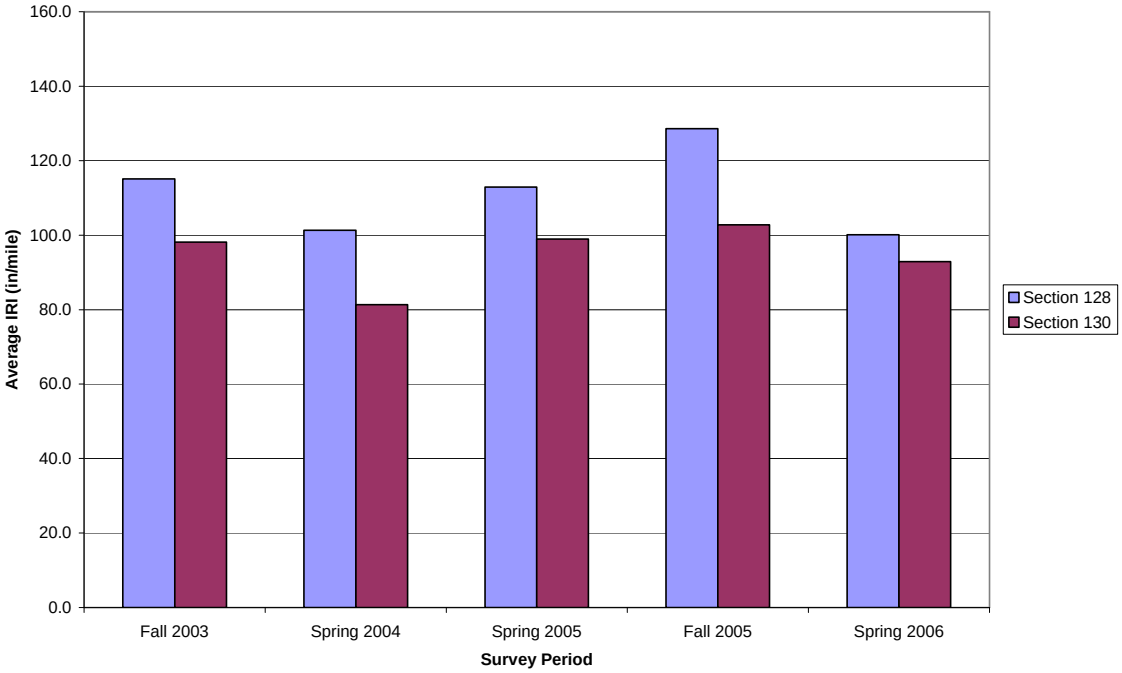

Figure F.47. IRI inside wheel path, 4.5” depth, HMA S. R., no fibers, 4.5’ panel

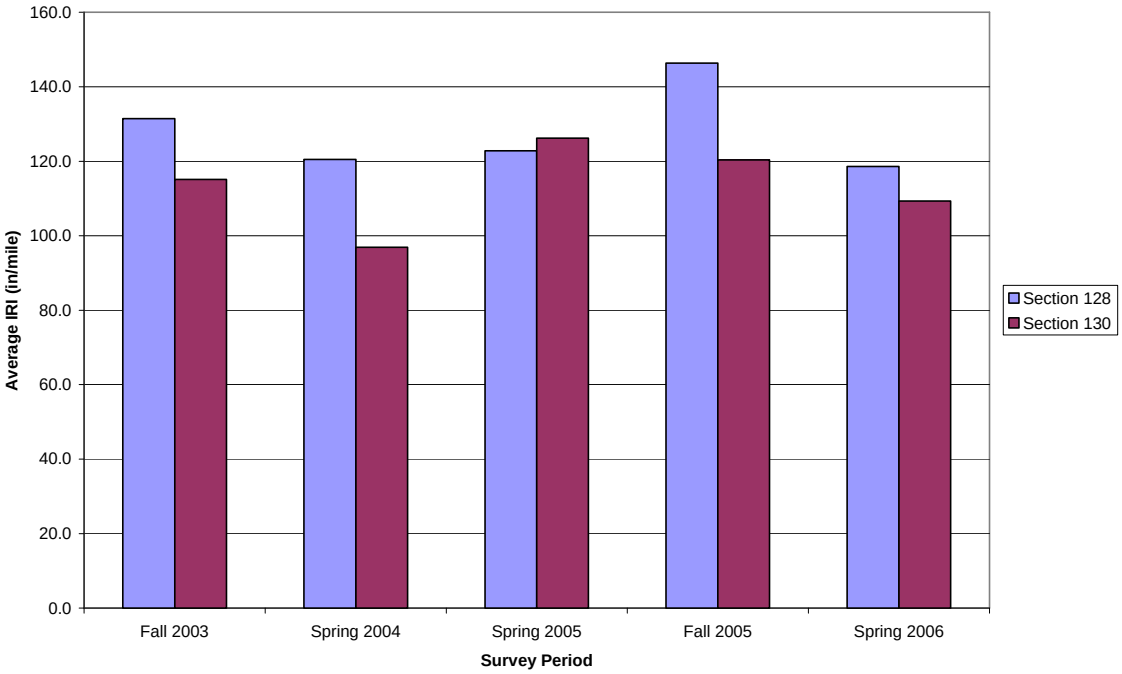

Figure F.48. IRI outside wheel path, 4.5” depth, HMA S. R., no fibers, 4.5’ panel

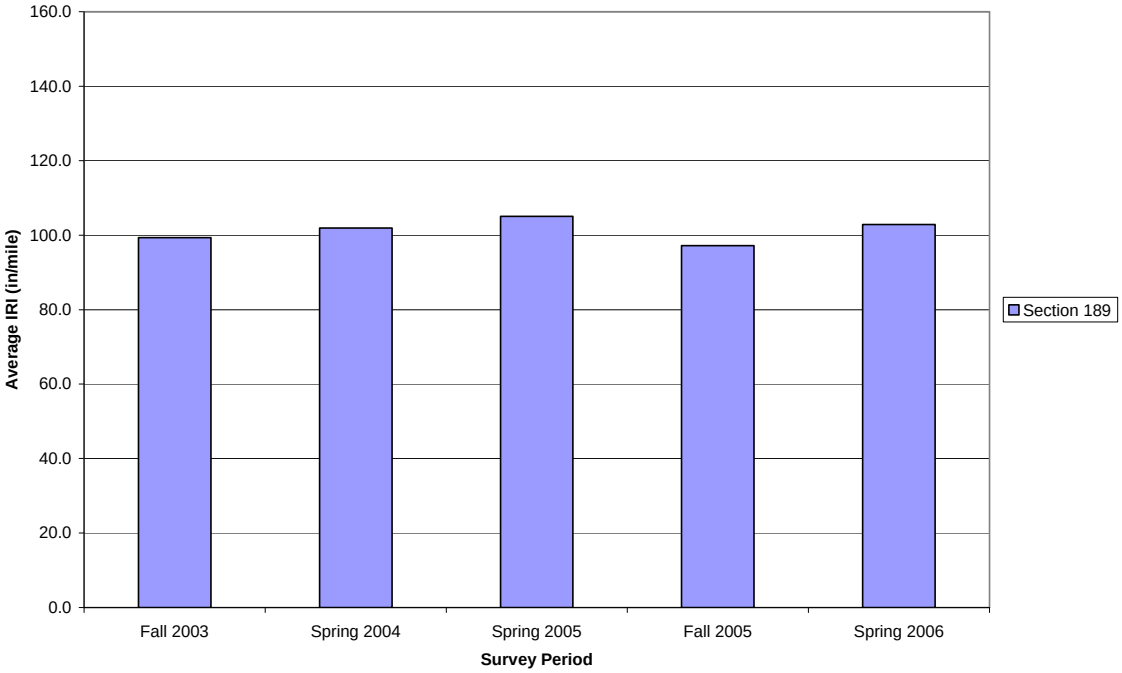

Figure F.49. IRI inside wheel path, 4.5” depth, patch, no fibers, 4.5’ panel

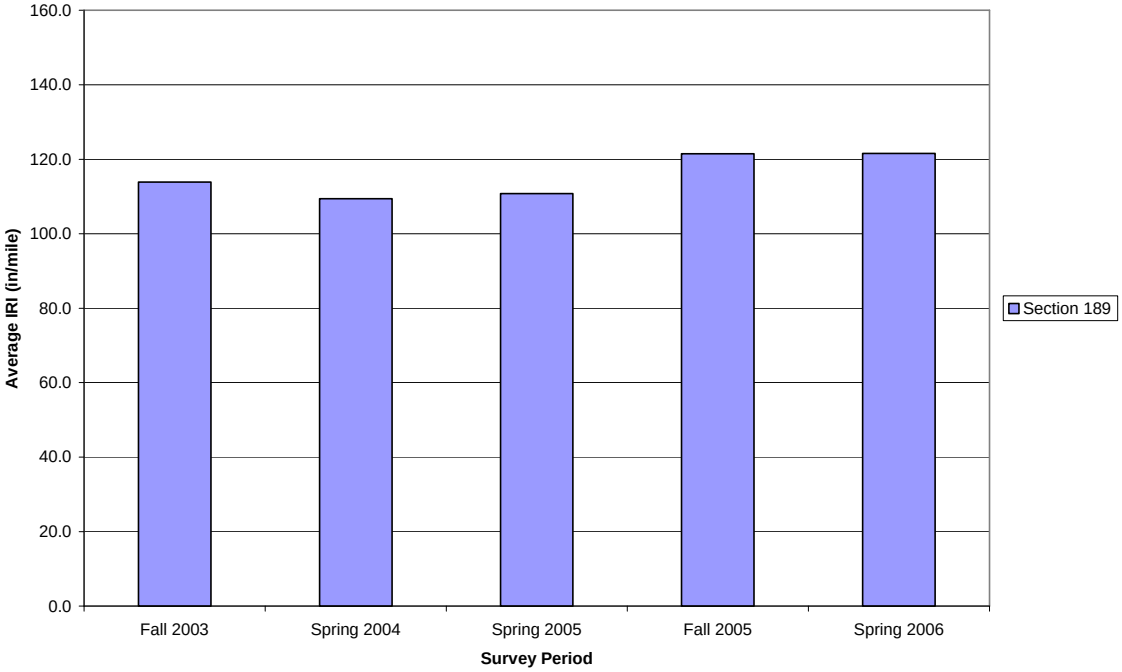

Figure F.50. IRI outside wheel path, 4.5” depth, patch, no fibers, 4.5’ panel

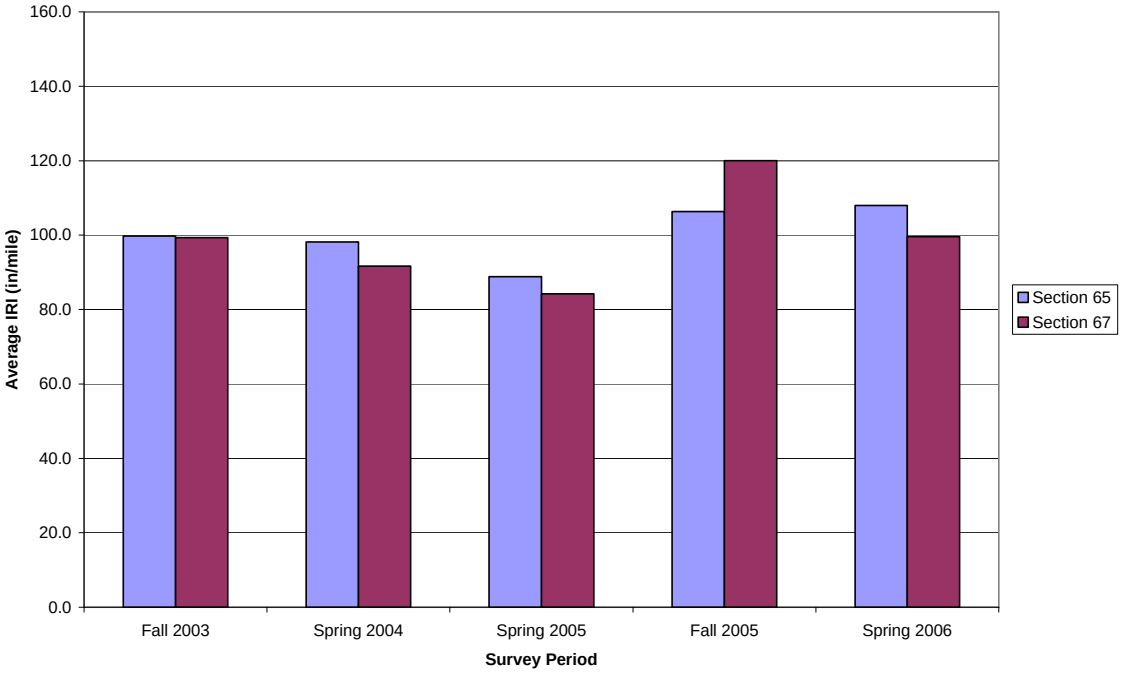

Figure F.51. IRI inside wheel path, 4.5” depth, scarify, no fibers, 6’ panel

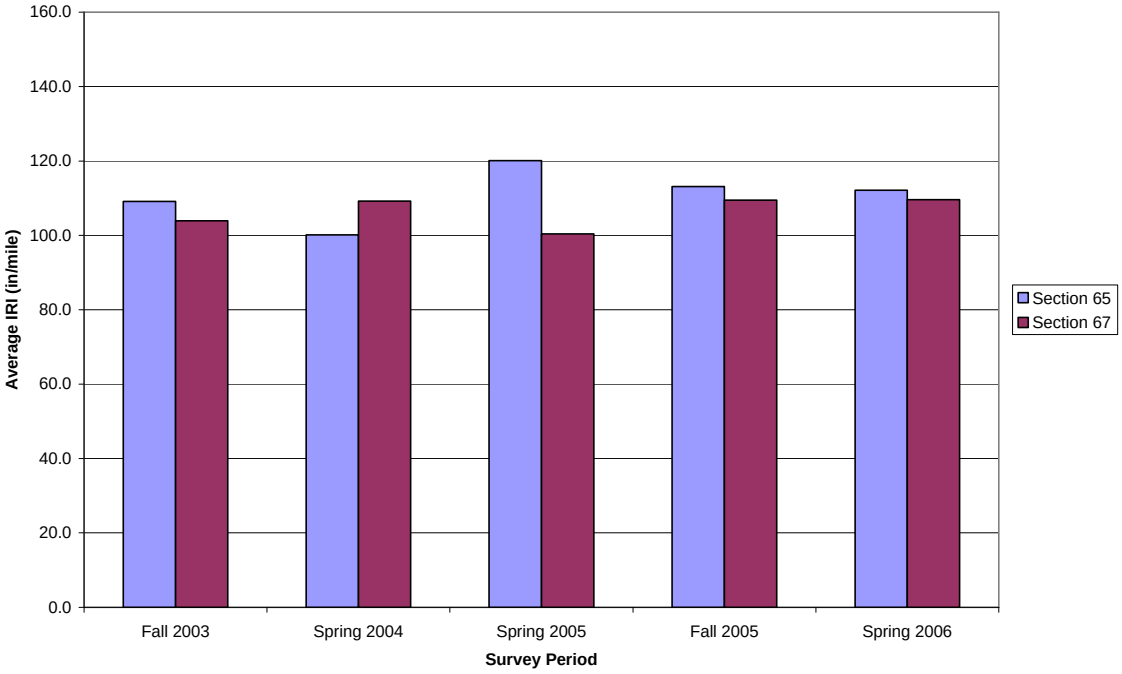

Figure F.52. IRI outside wheel path, 4.5” depth, scarify, no fibers, 6’ panel

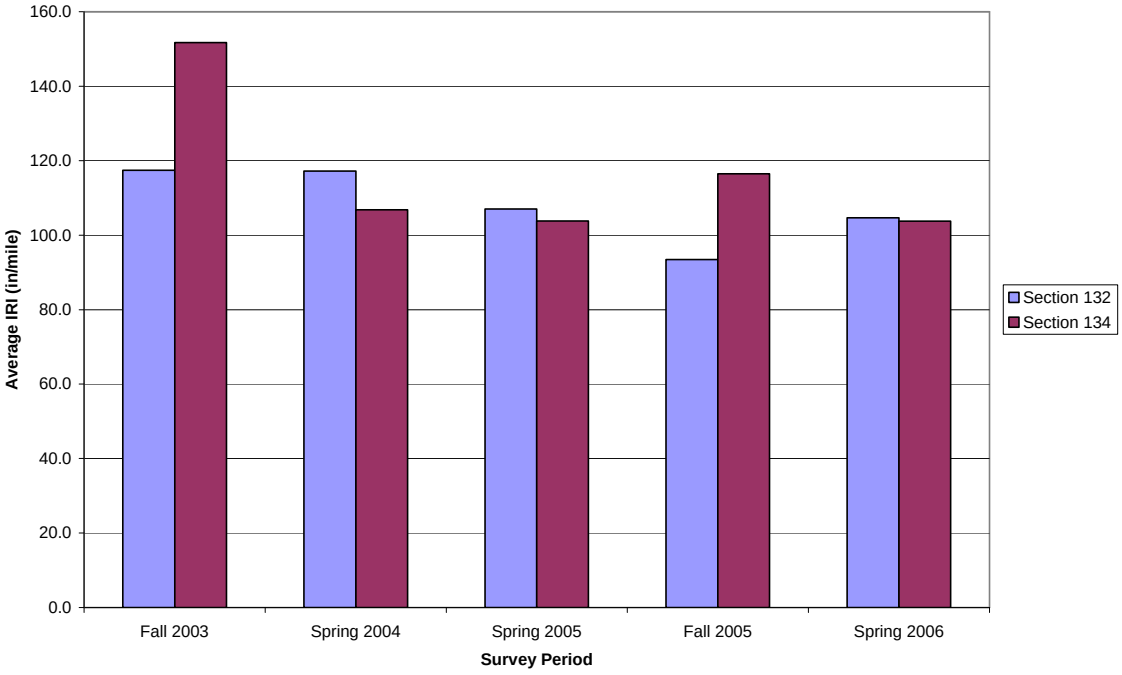

Figure F.53. IRI inside wheel path, 4.5” depth, HMA S. R., no fibers, 6’ panel

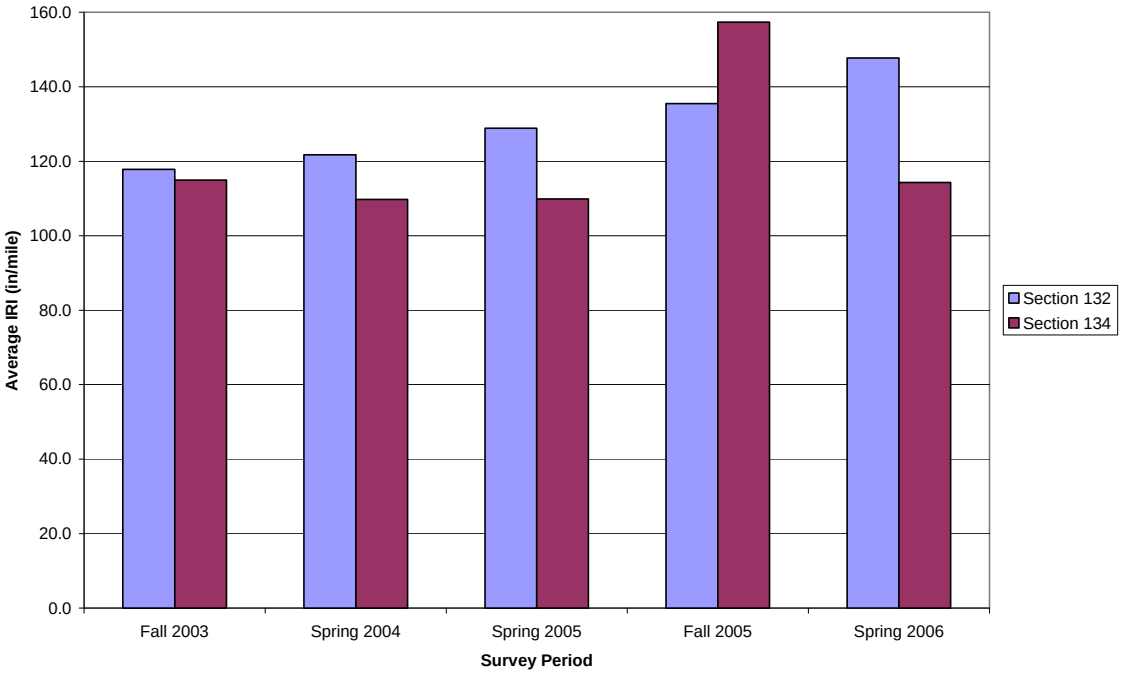

Figure F.54. IRI outside wheel path, 4.5” depth, HMA S. R., no fibers, 6’ panel

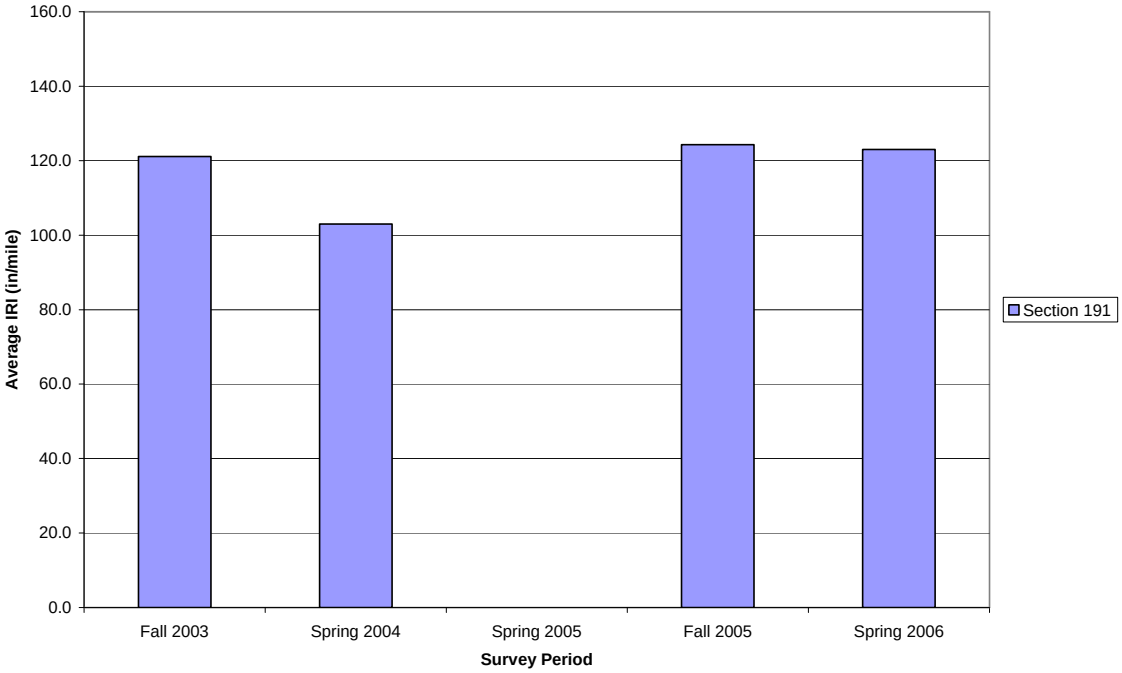

Figure F.55. IRI inside wheel path, 4.5” depth, patch, no fibers, 6’ panel

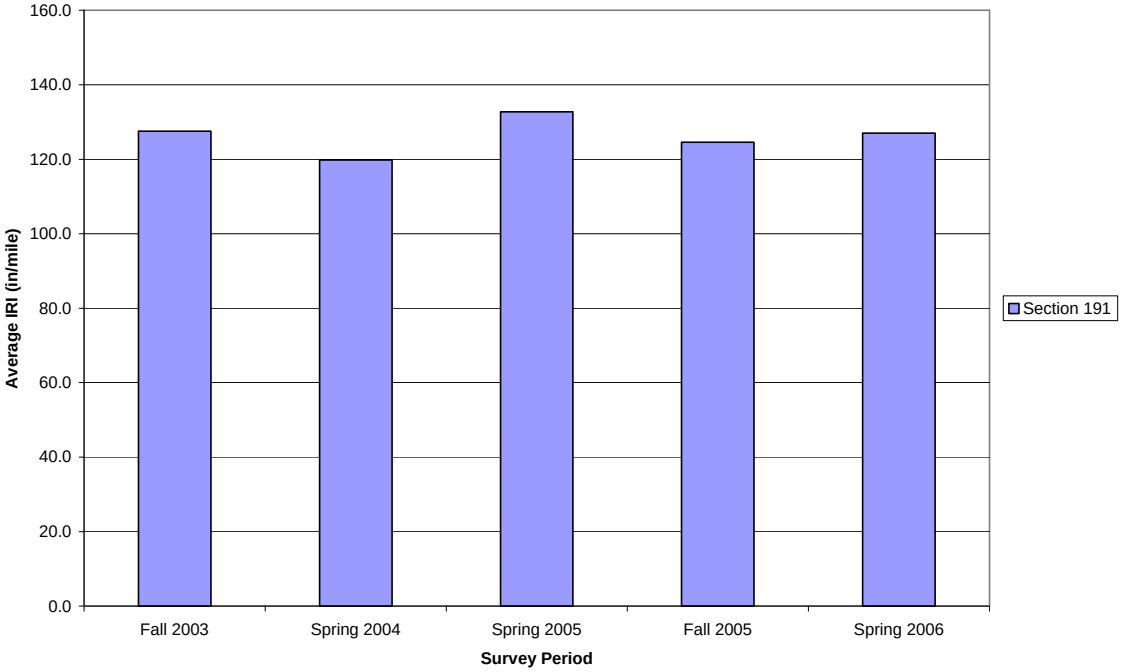

Figure F.56. IRI outside wheel path, 4.5” depth, patch, no fibers, 6’ panel

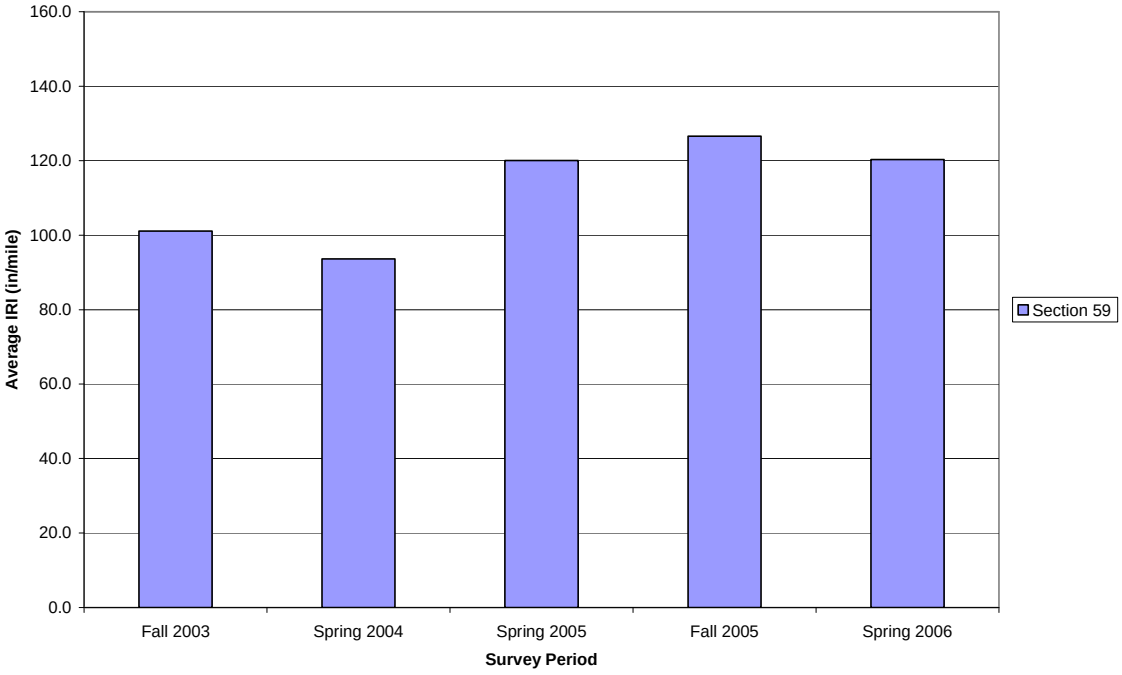

Figure F.57. IRI inside wheel path, 4.5” depth, remove, no fibers, 6’ panel

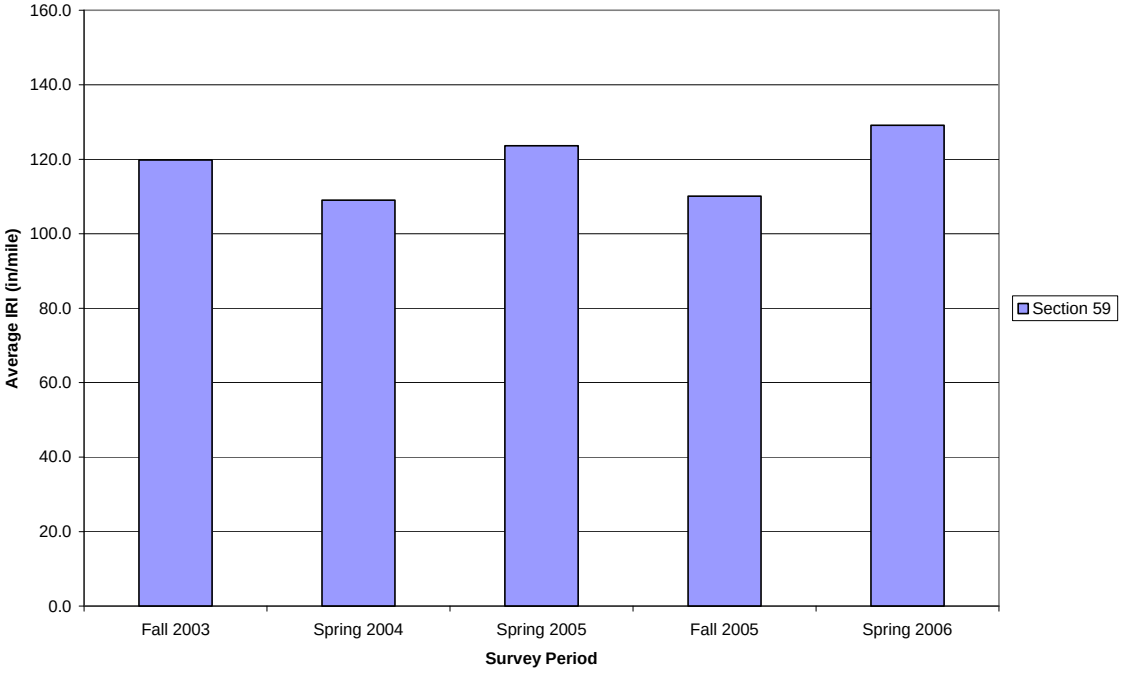

Figure F.58. IRI outside wheel path, 4.5” depth, remove, no fibers, 6’ panel

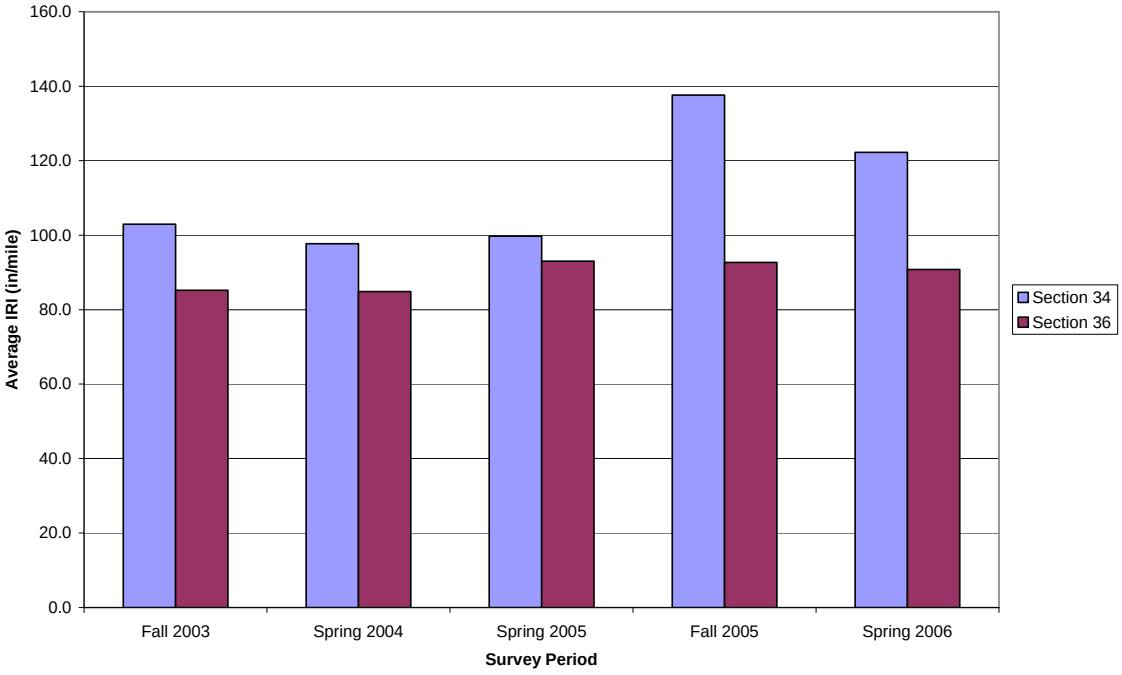

Figure F.59. IRI inside wheel path, 4.5” depth, scarify, fiber A, 4.5’ panel

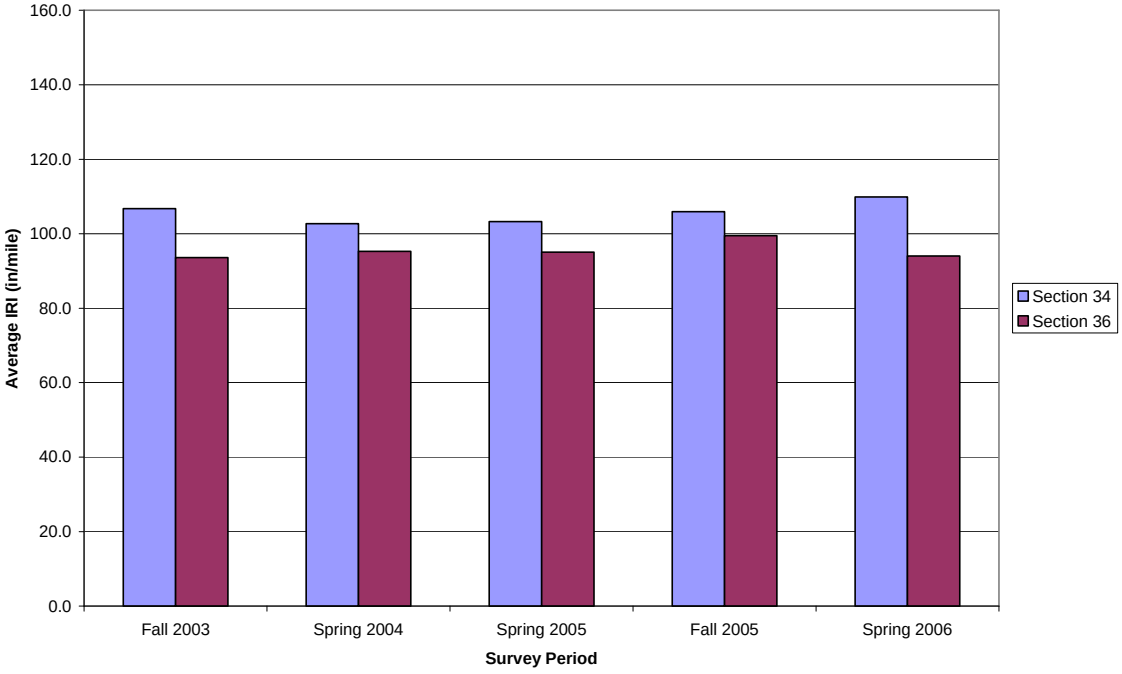

Figure F.60. IRI outside wheel path, 4.5” depth, scarify, fiber A, 4.5’ panel

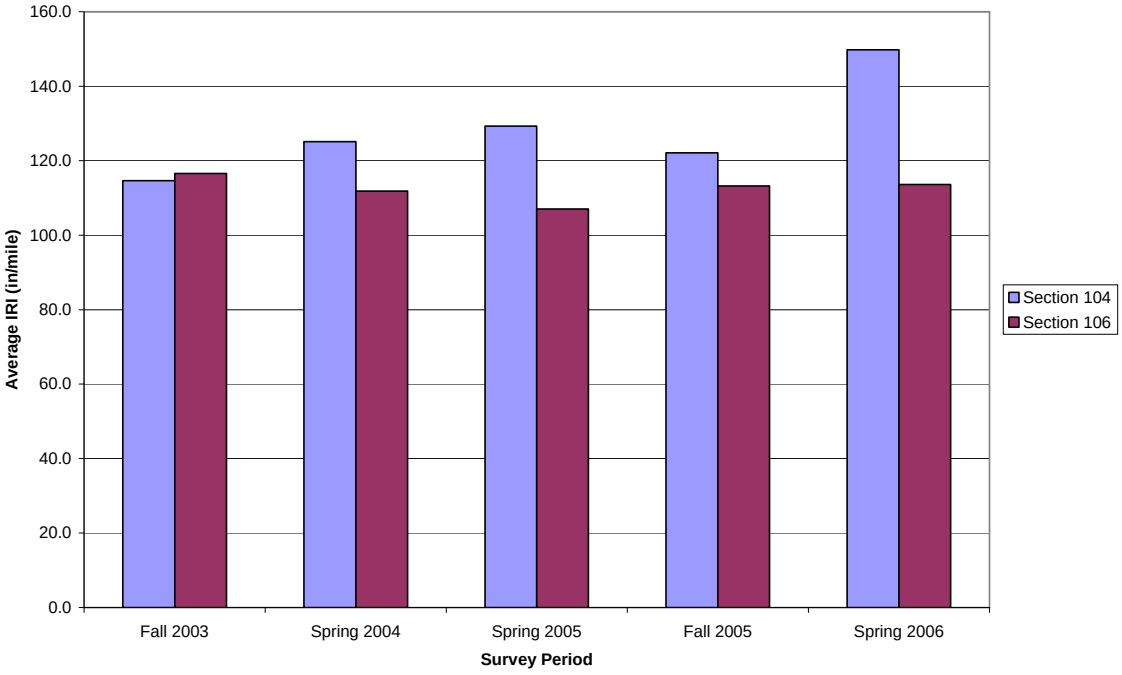

Figure F.61. IRI inside wheel path, 4.5” depth, HMA S. R., fiber A, 4.5’ panel

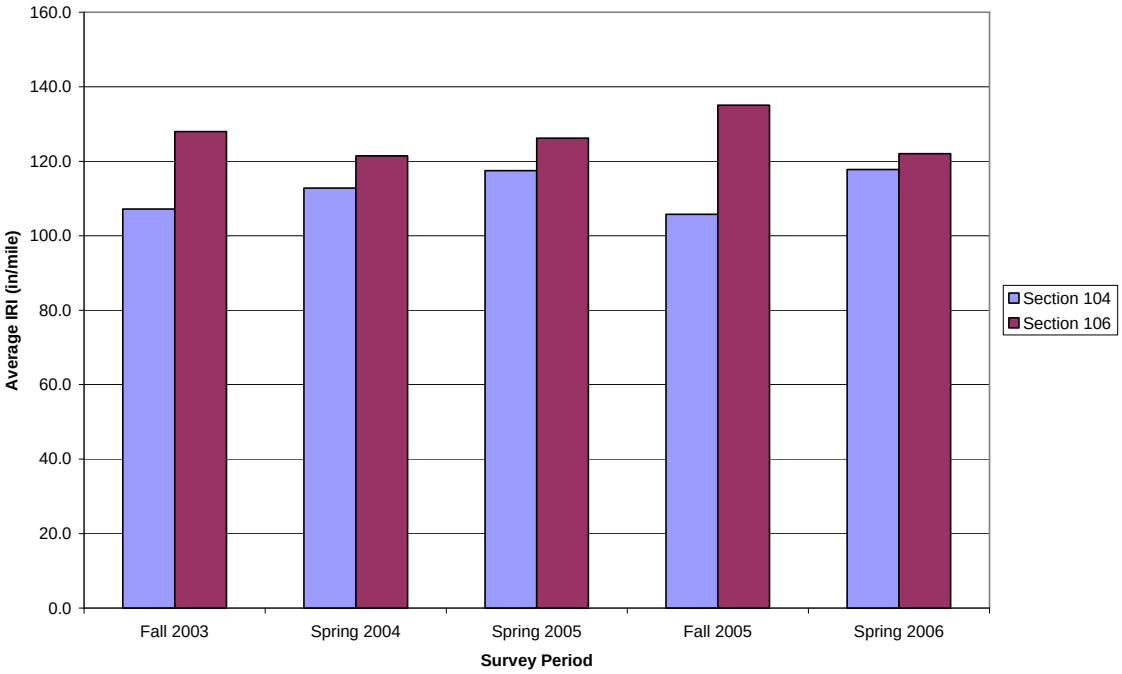

Figure F.62. IRI outside wheel path, 4.5” depth, HMA S. R., fiber A, 4.5’ panel

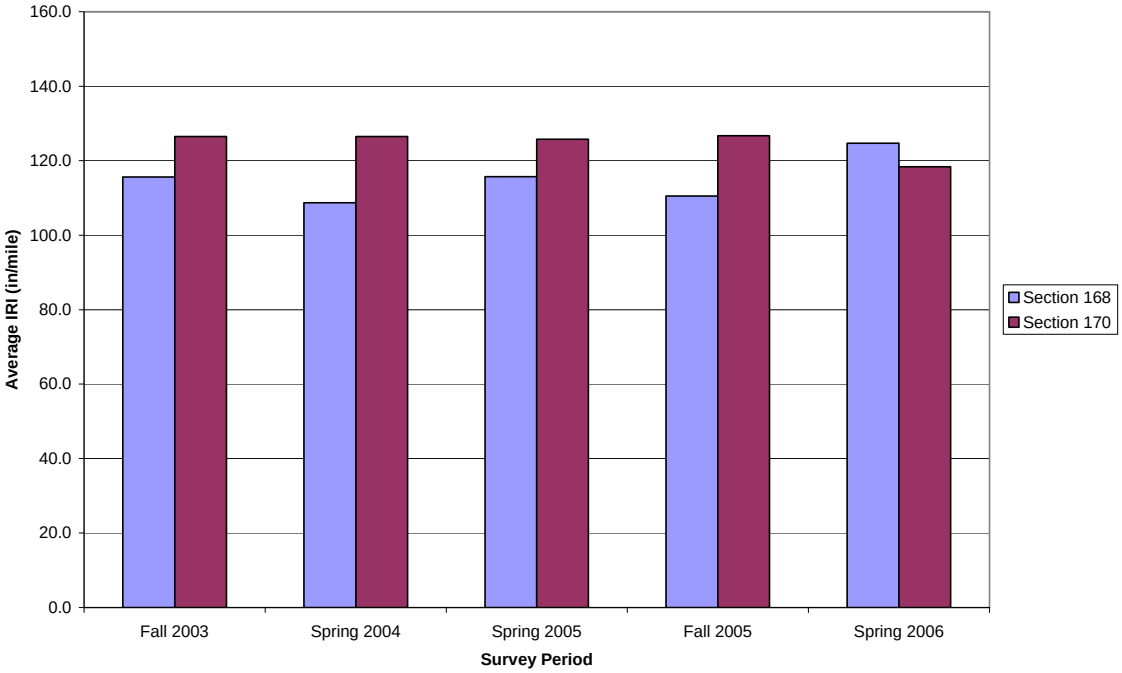

Figure F.63. IRI inside wheel path, 4.5” depth, patch, fiber A, 4.5’ panel

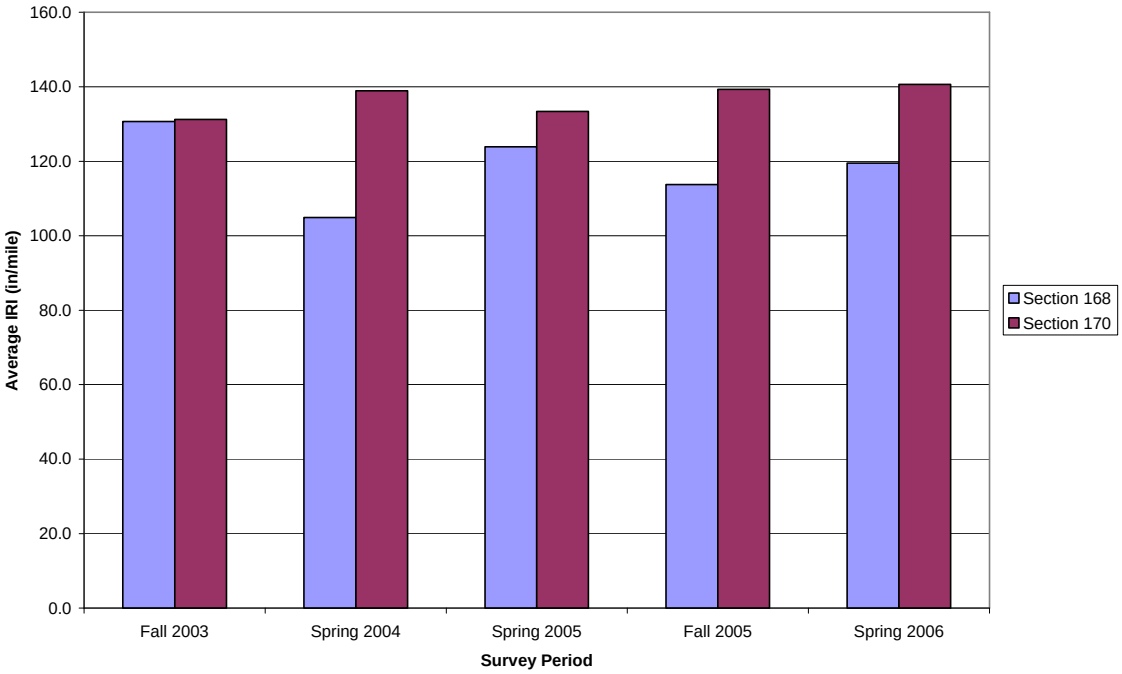

Figure F.64. IRI outside wheel path, 4.5” depth, patch, fiber A, 4.5’ panel

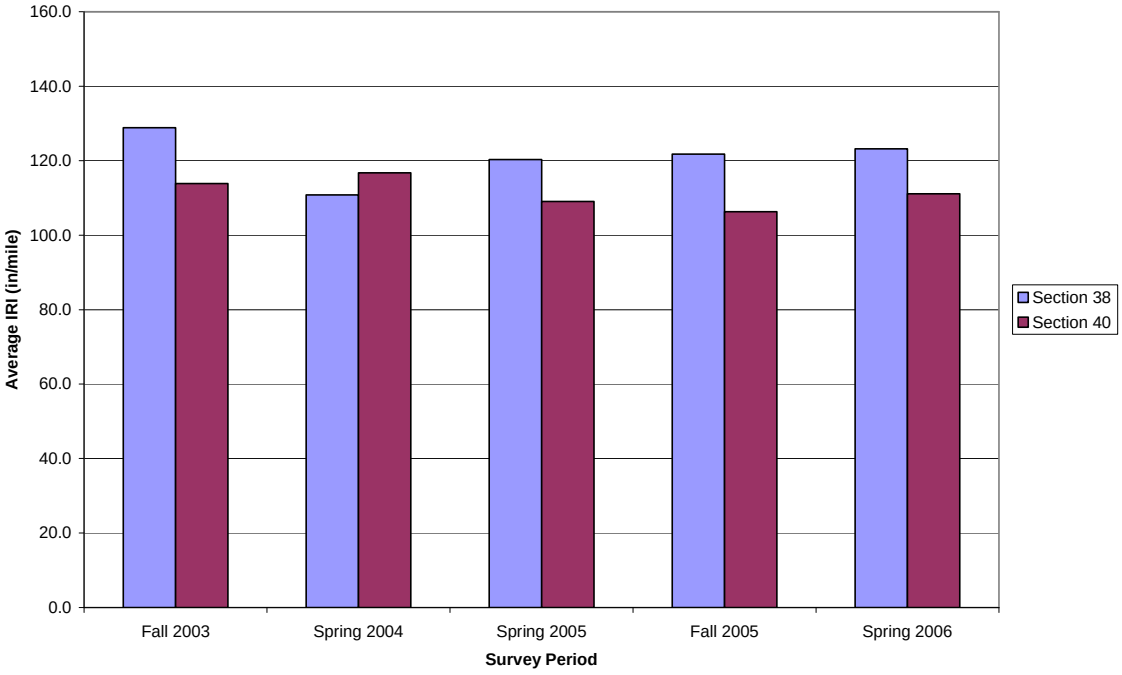

Figure F.65. IRI inside wheel path, 4.5” depth, scarify, fiber A, 6’ panel

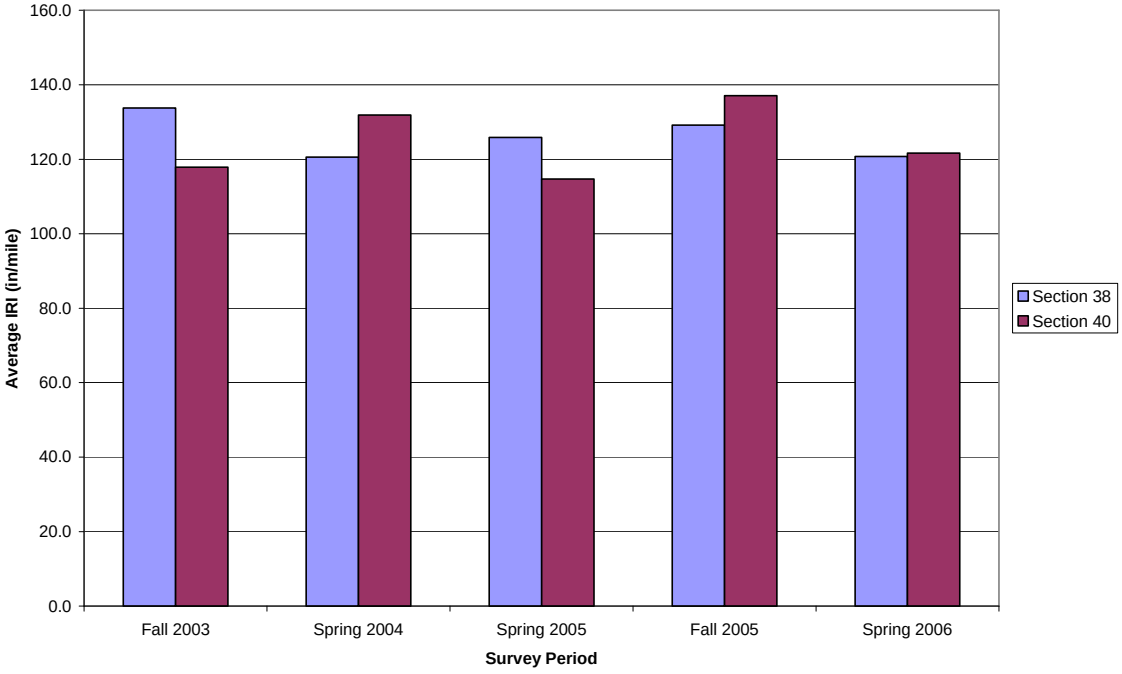

Figure F.66. IRI outside wheel path, 4.5” depth, scarify, fiber A, 6’ panel

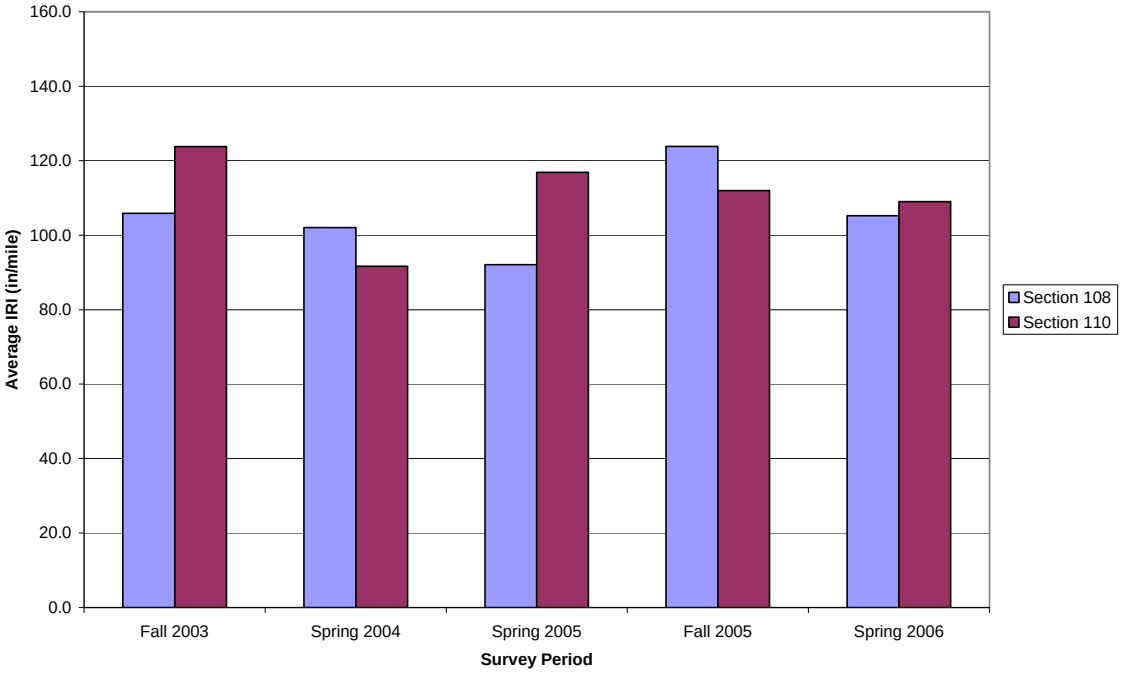

Figure F.67. IRI inside wheel path, 4.5” depth, HMA S. R., fiber A, 6’ panel

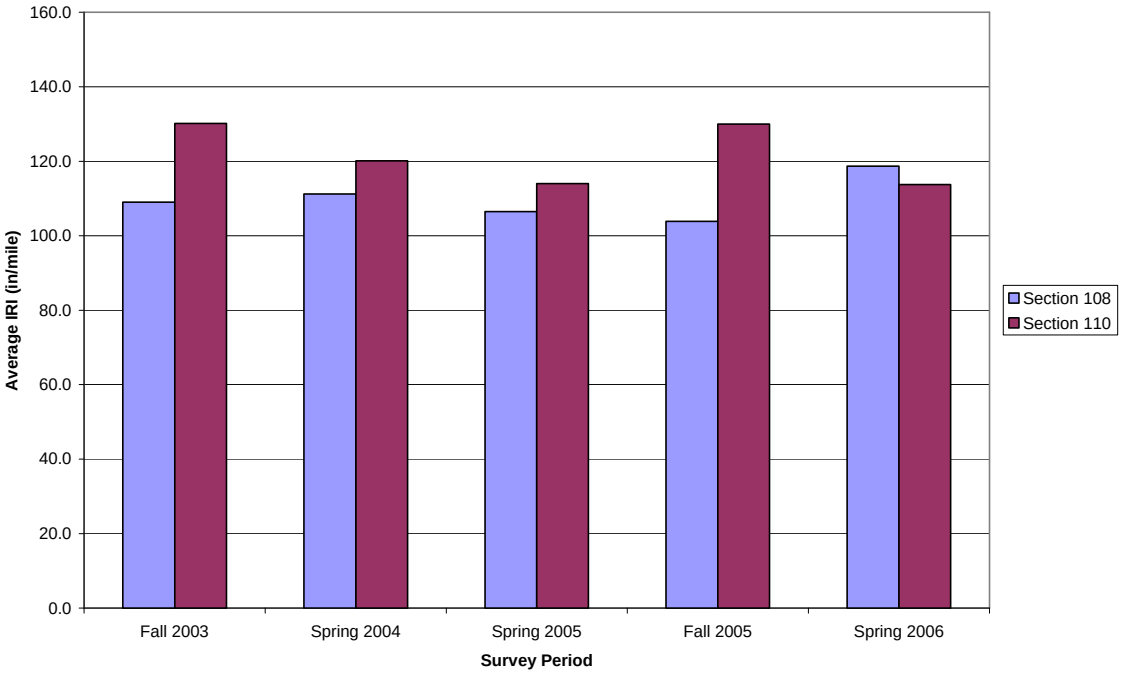

Figure F.68. IRI outside wheel path, 4.5” depth, HMA S. R., fiber A, 6’ panel

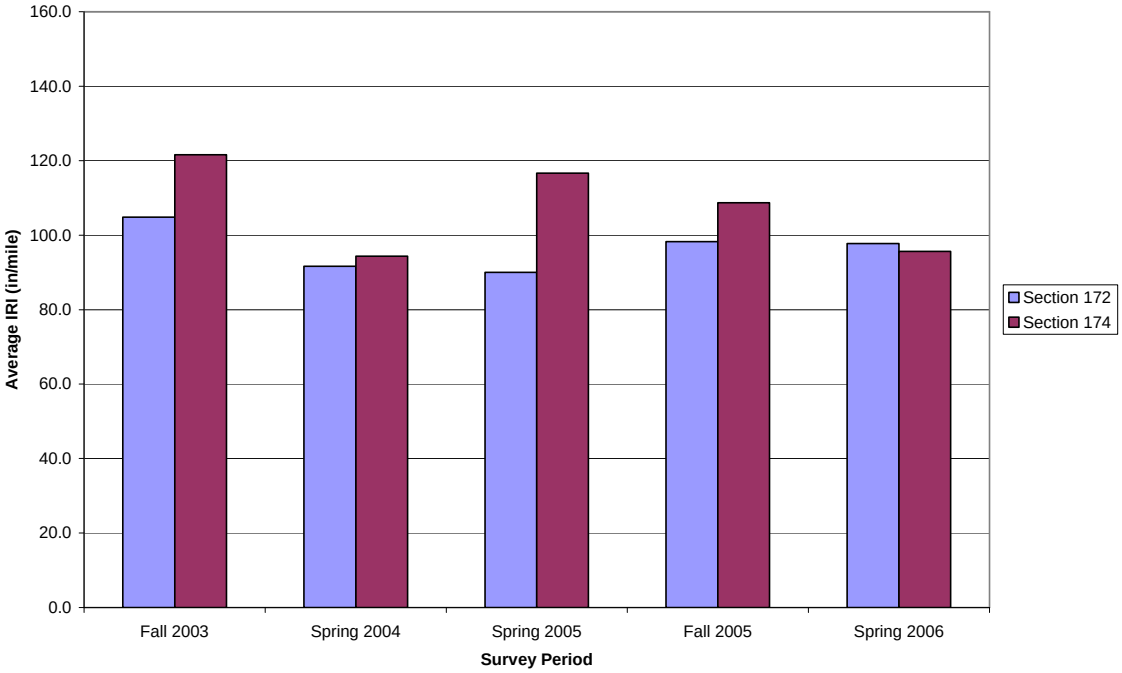

Figure F.69. IRI inside wheel path, 4.5” depth, patch, fiber A, 6’ panel

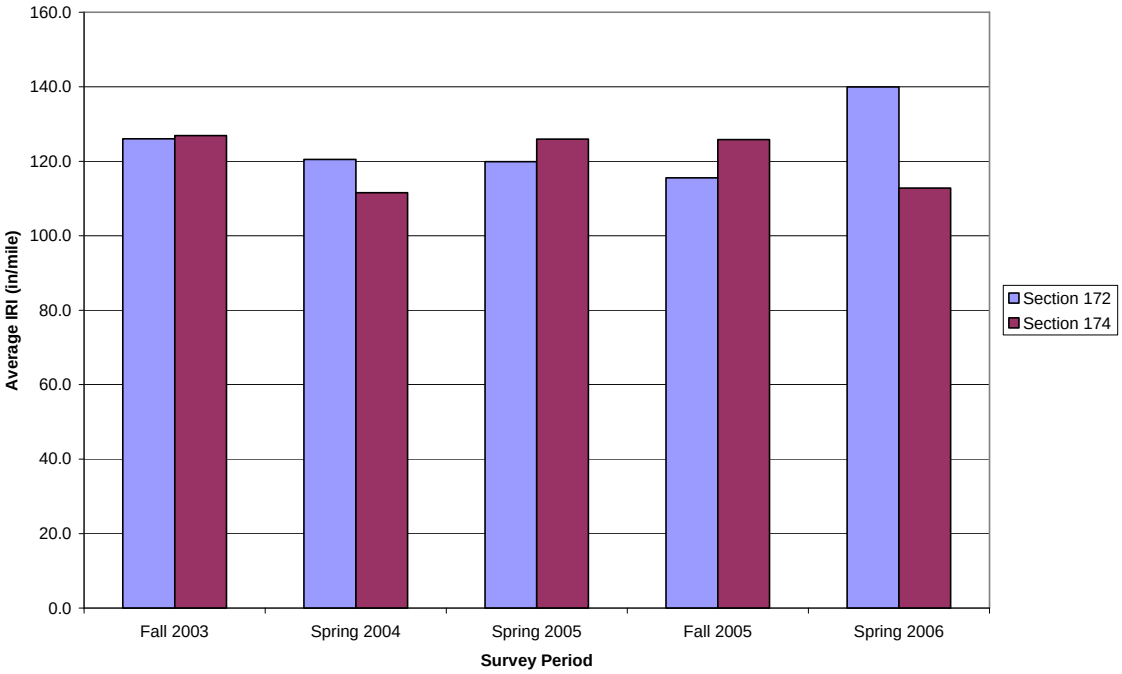

Figure F.70. IRI outside wheel path, 4.5” depth, patch, fiber A, 6’ panel

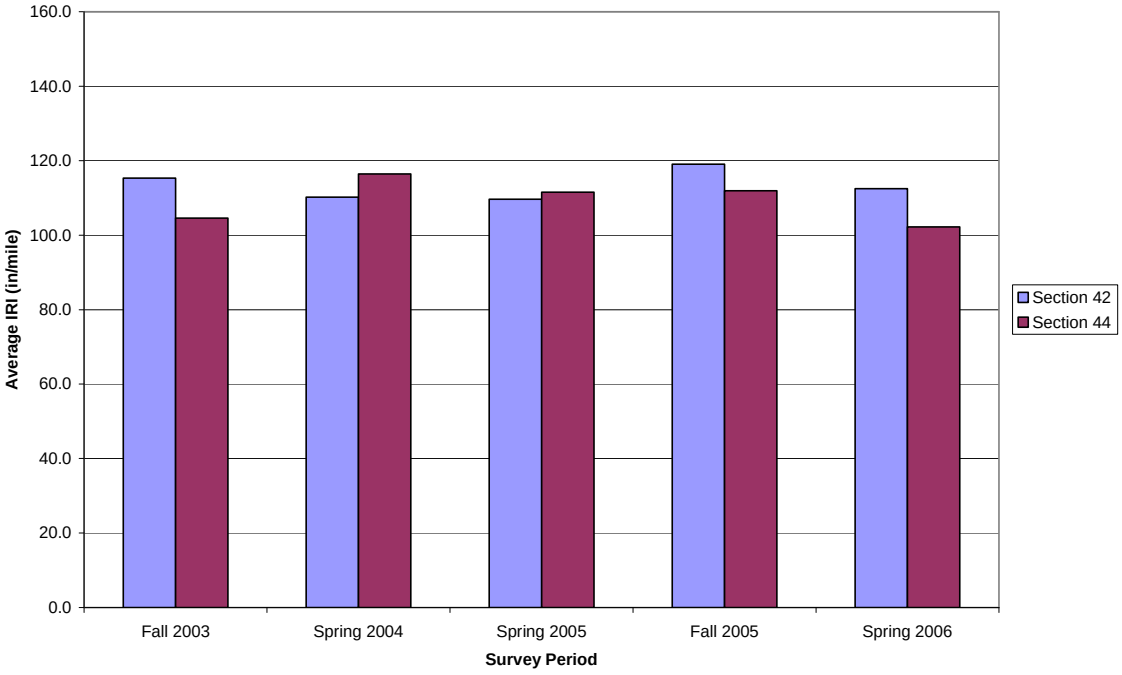

Figure F.71. IRI inside wheel path, 4.5” depth, scarify, fiber B, 4.5’ panel

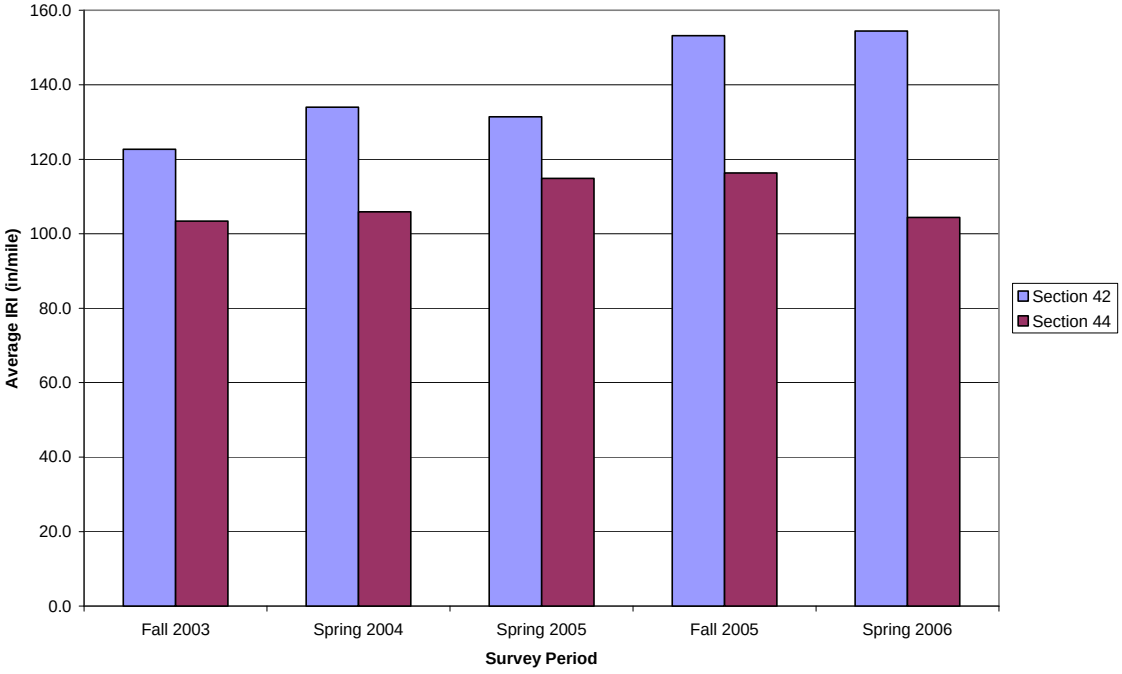

Figure F.72. IRI outside wheel path, 4.5” depth, scarify, fiber B, 4.5’ panel

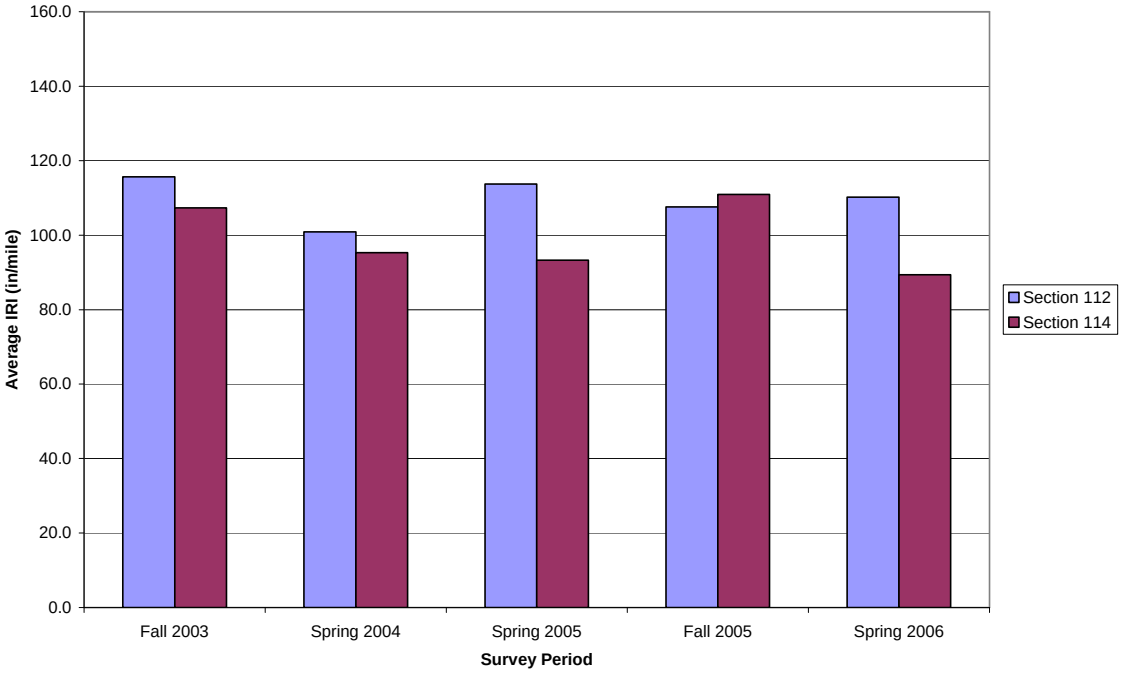

Figure F.73. IRI inside wheel path, 4.5” depth, HMA S. R., fiber B, 4.5’ panel

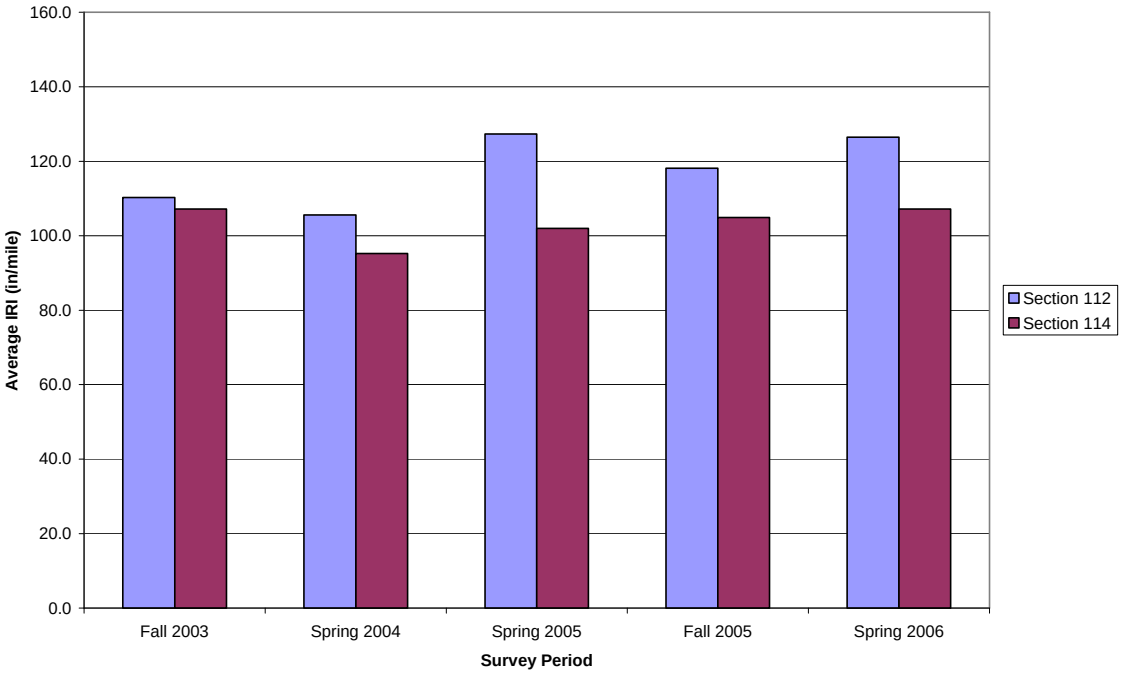

Figure F.74. IRI outside wheel path, 4.5” depth, HMA S. R., fiber B, 4.5’ panel

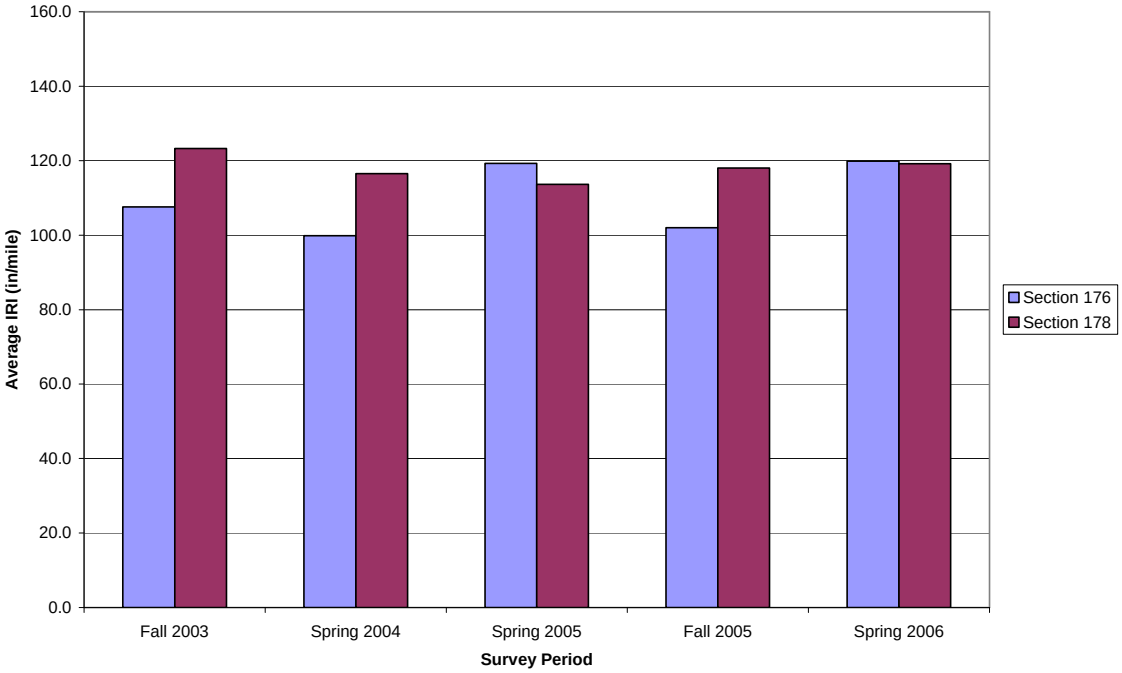

Figure F.75. IRI inside wheel path, 4.5” depth, patch, fiber B, 4.5’ panel

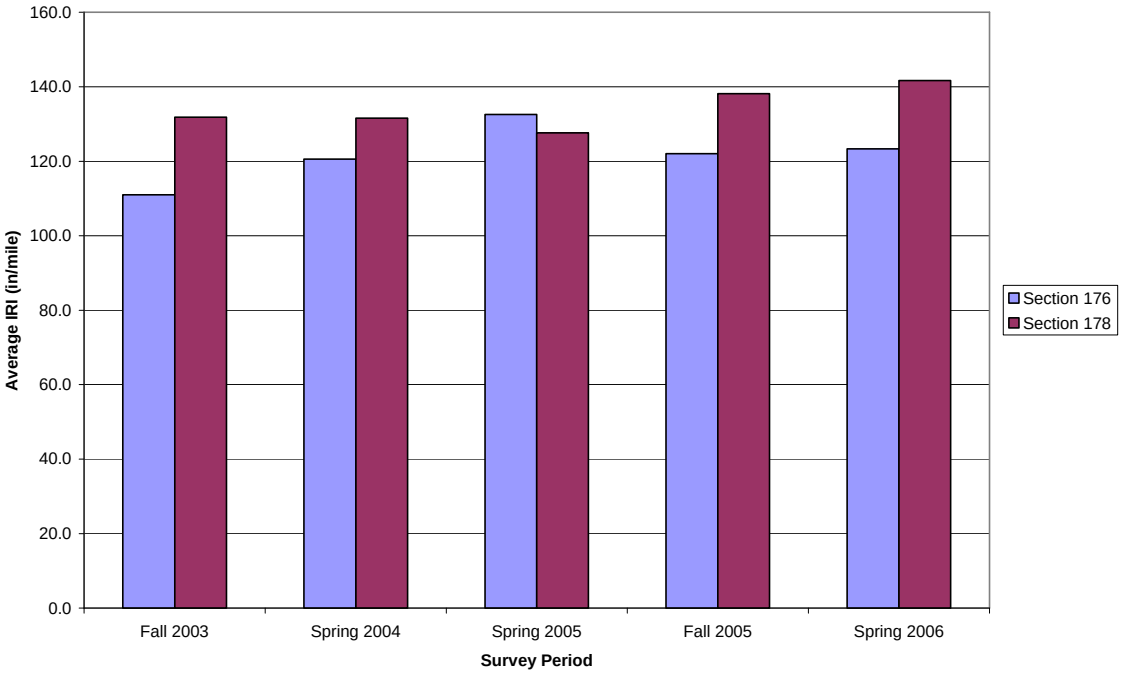

Figure F.76. IRI outside wheel path, 4.5” depth, patch, fiber B, 4.5’ panel

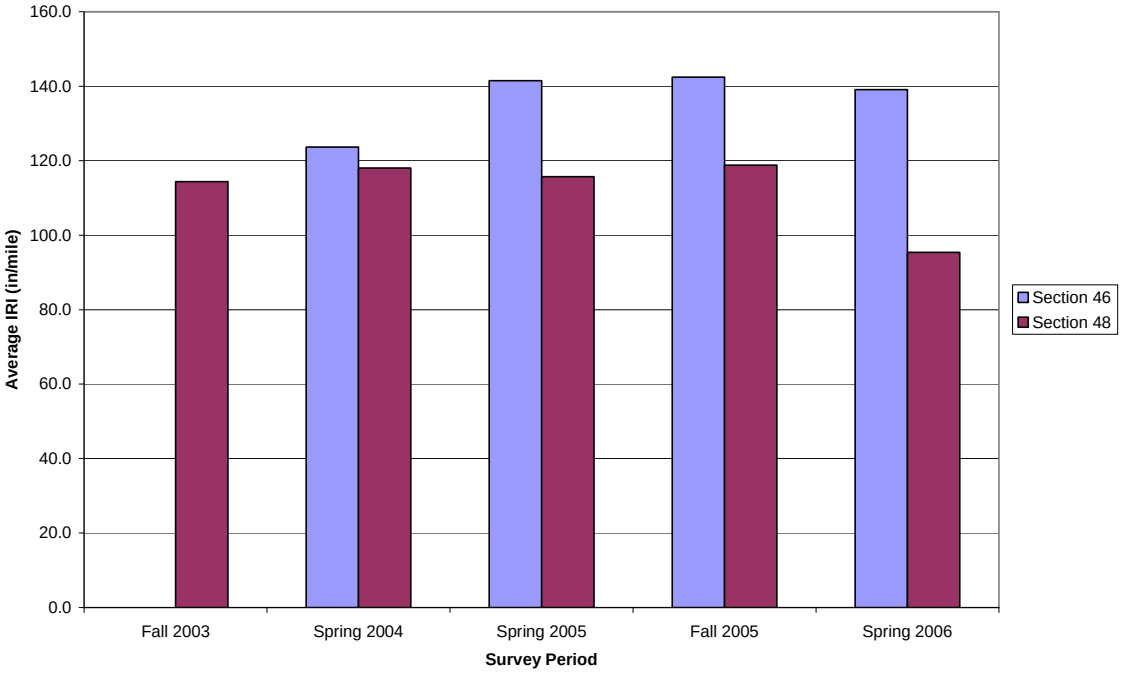

Figure F.77. IRI inside wheel path, 4.5” depth, scarify, fiber B, 6’ panel

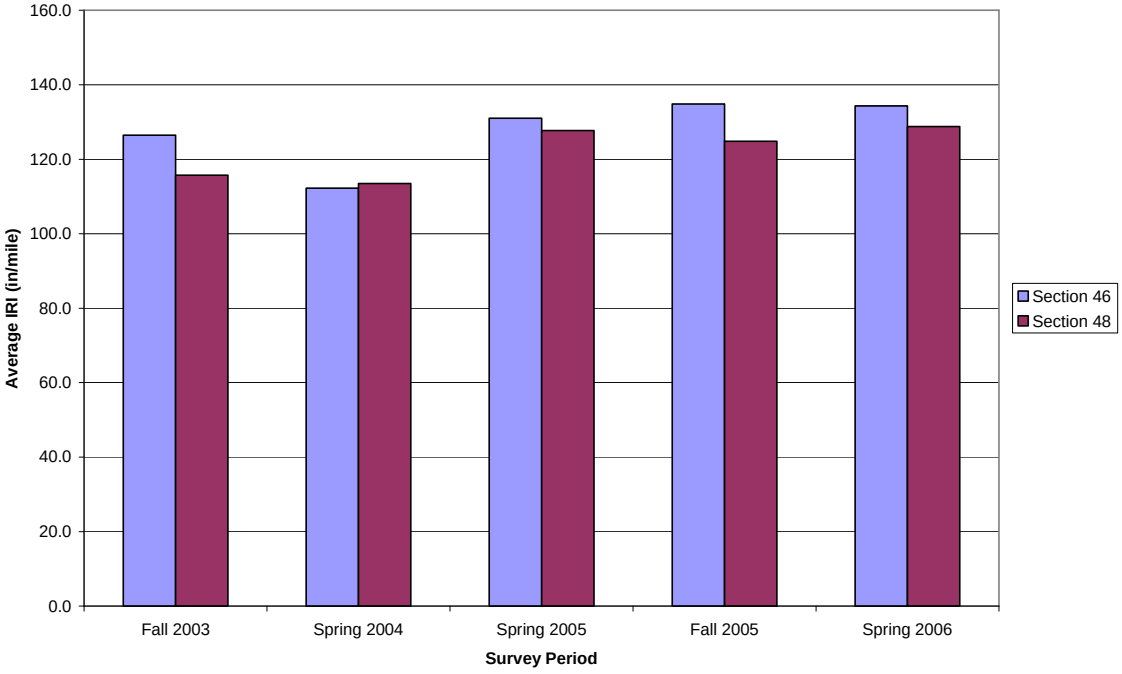

Figure F.78. IRI outside wheel path, 4.5” depth, scarify, fiber B, 6’ panel

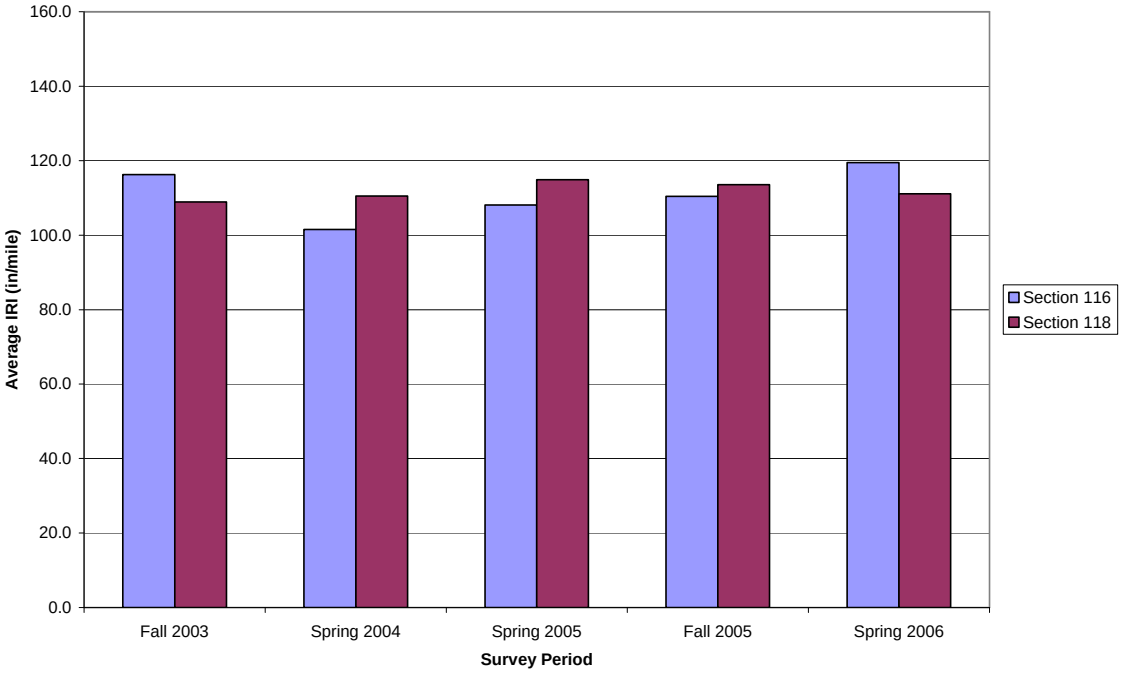

Figure F.79. IRI inside wheel path, 4.5” depth, HMA S. R., fiber B, 6’ panel

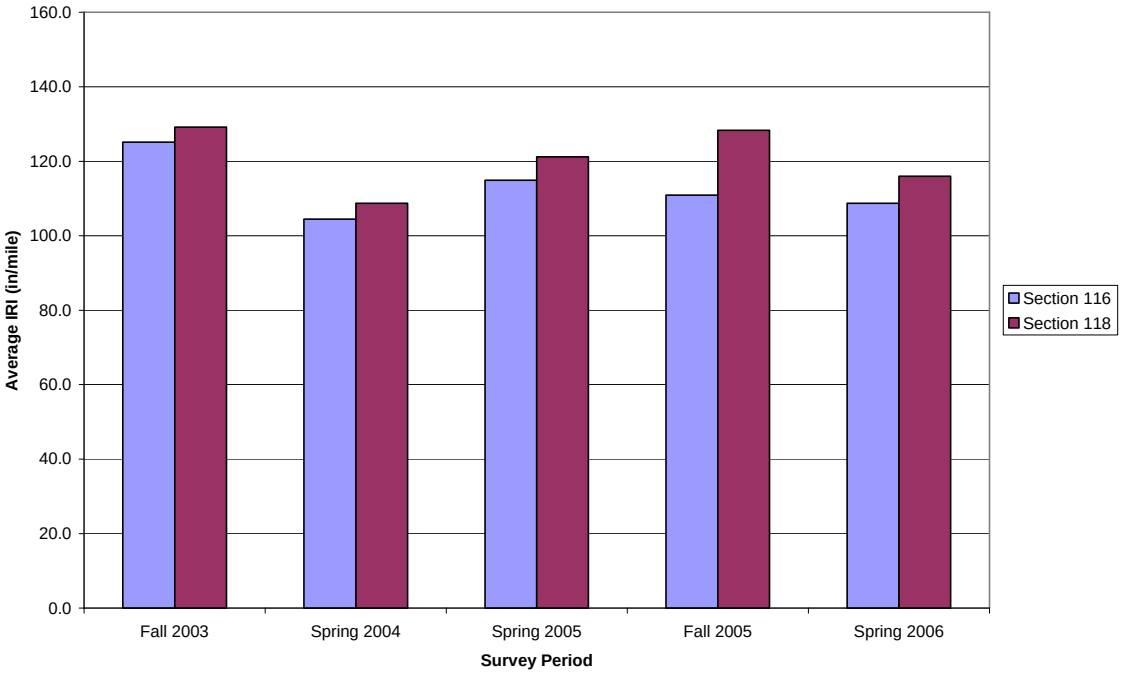

Figure F.80. IRI outside wheel path, 4.5” depth, HMA S. R., fiber B, 6’ panel

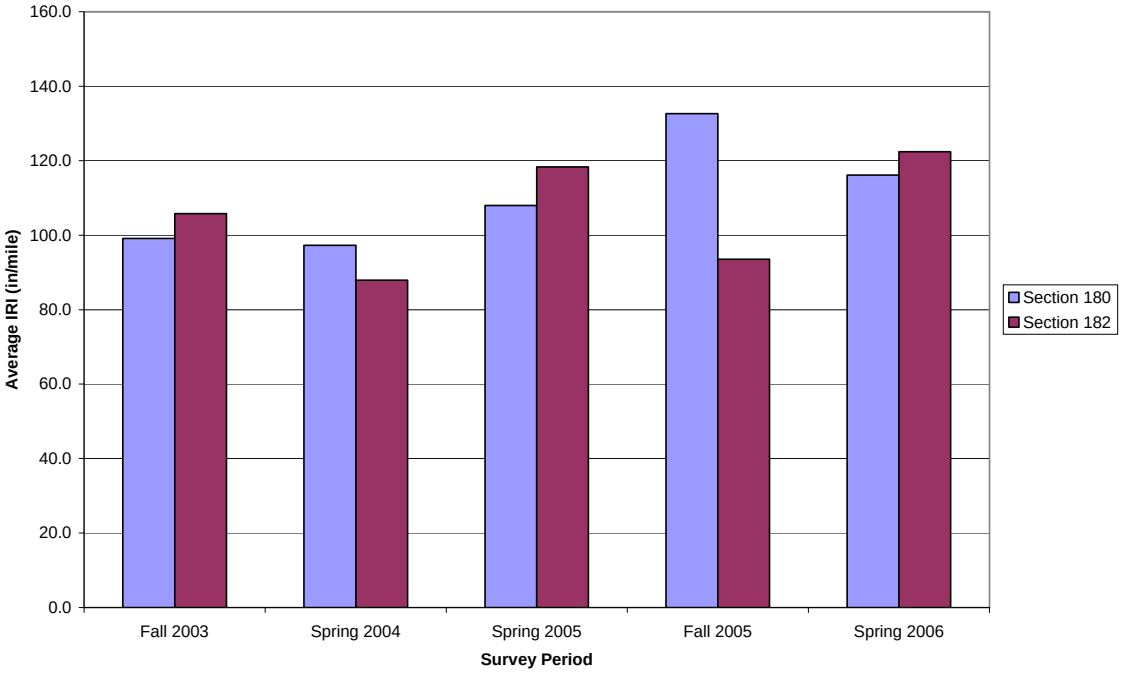

Figure F.81. IRI inside wheel path, 4.5” depth, patch, fiber B, 6’ panel

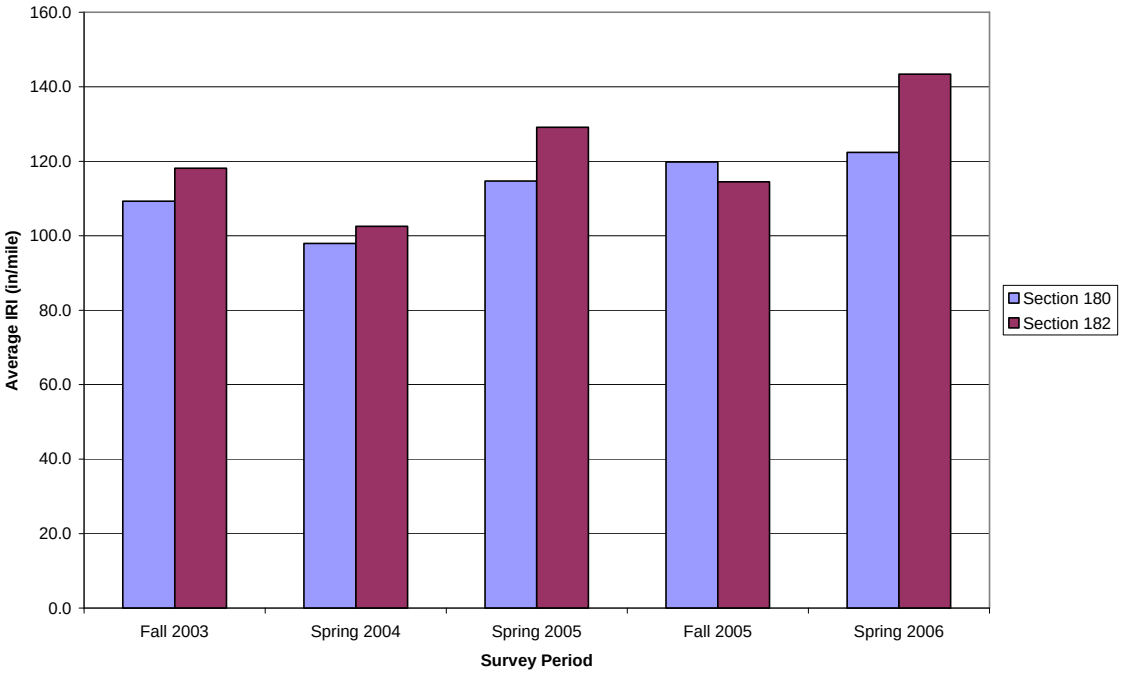

Figure F.82. IRI outside wheel path, 4.5” depth, patch, fiber B, 6’ panel

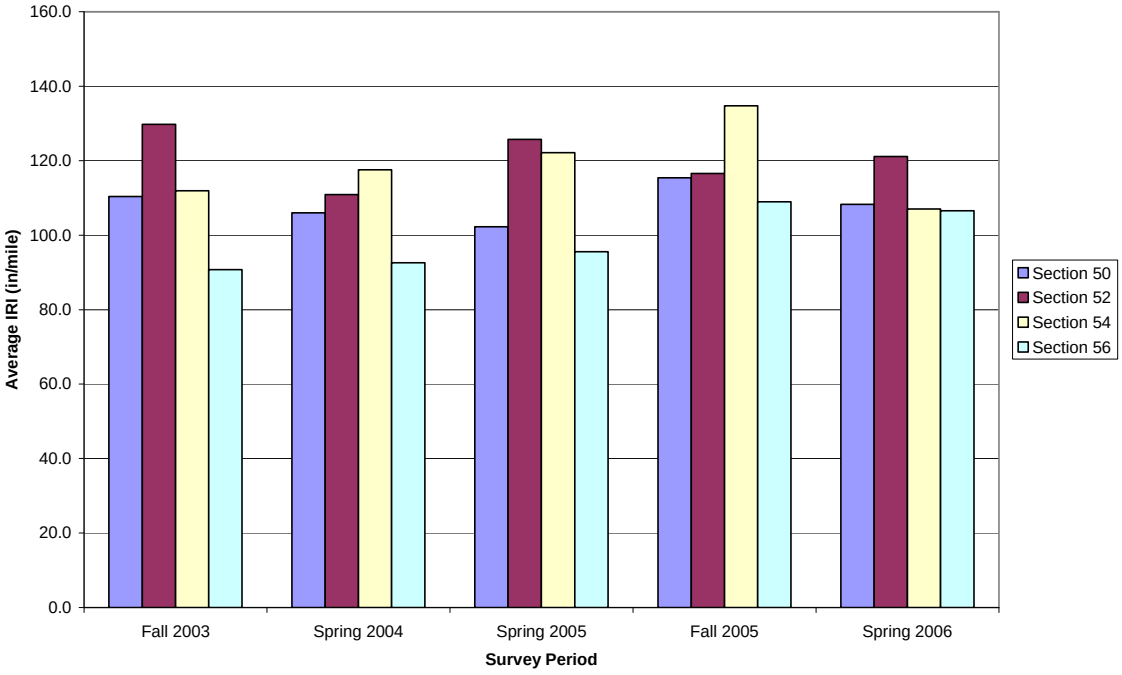

Figure F.83. IRI inside wheel path, 4.5” depth, scarify, fiber C, 9’ panel

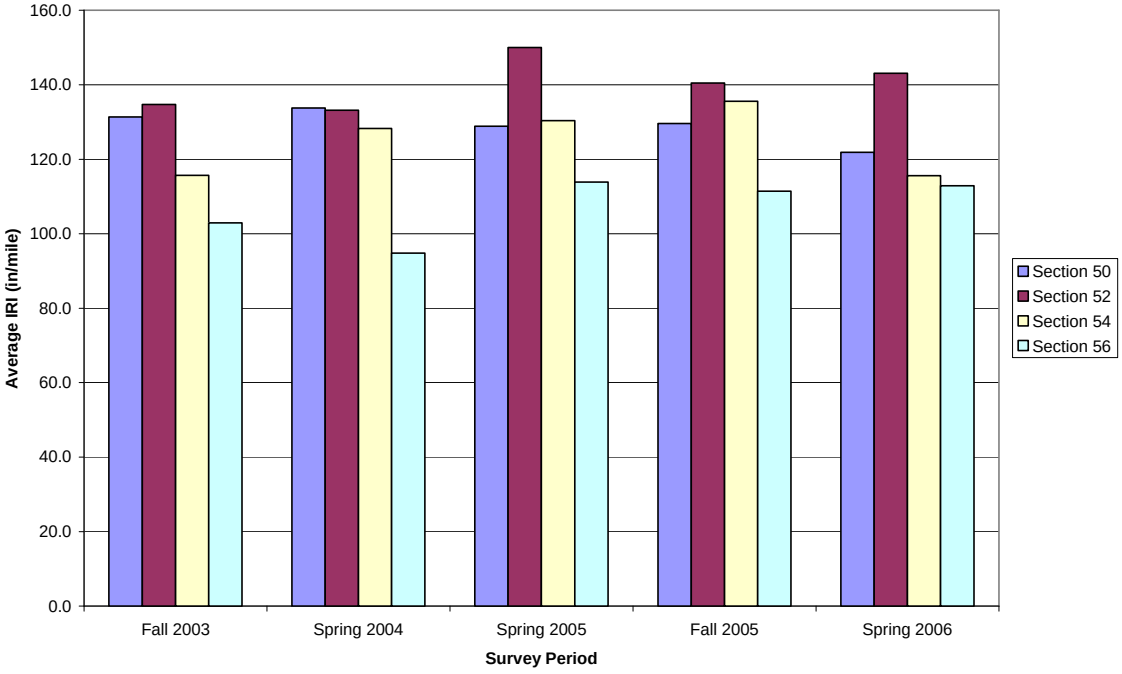

Figure F.84. IRI outside wheel path, 4.5” depth, scarify, fiber C, 9’ panel

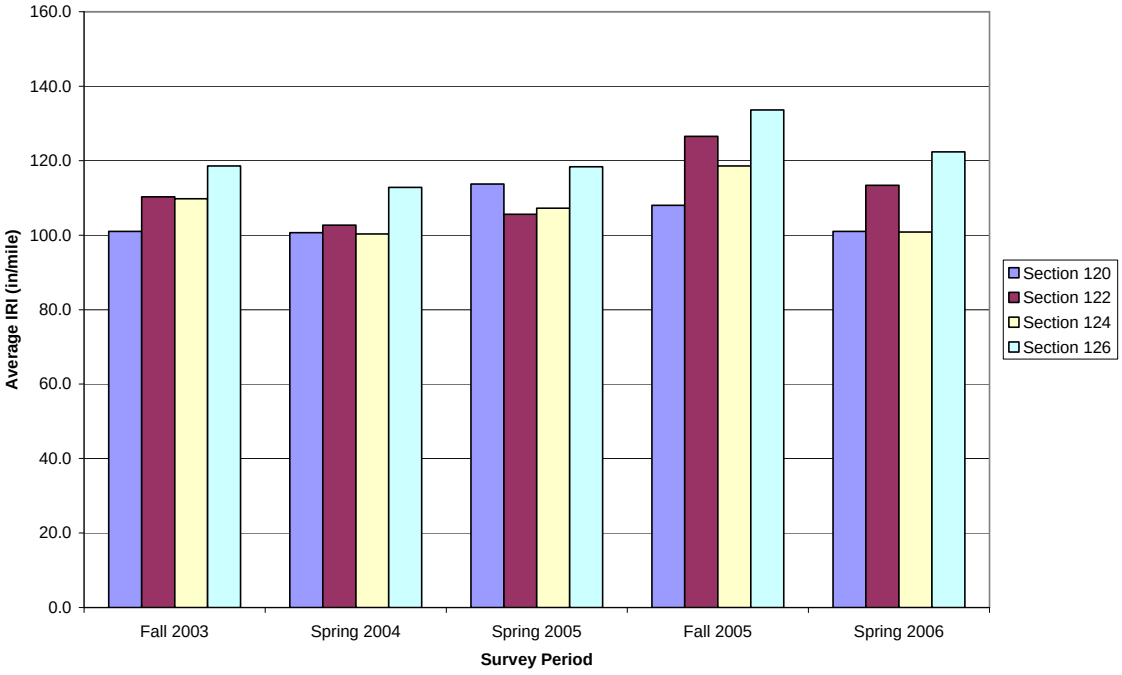

Figure F.85. IRI inside wheel path, 4.5” depth, HMA S. R., fiber C, 9’ panel

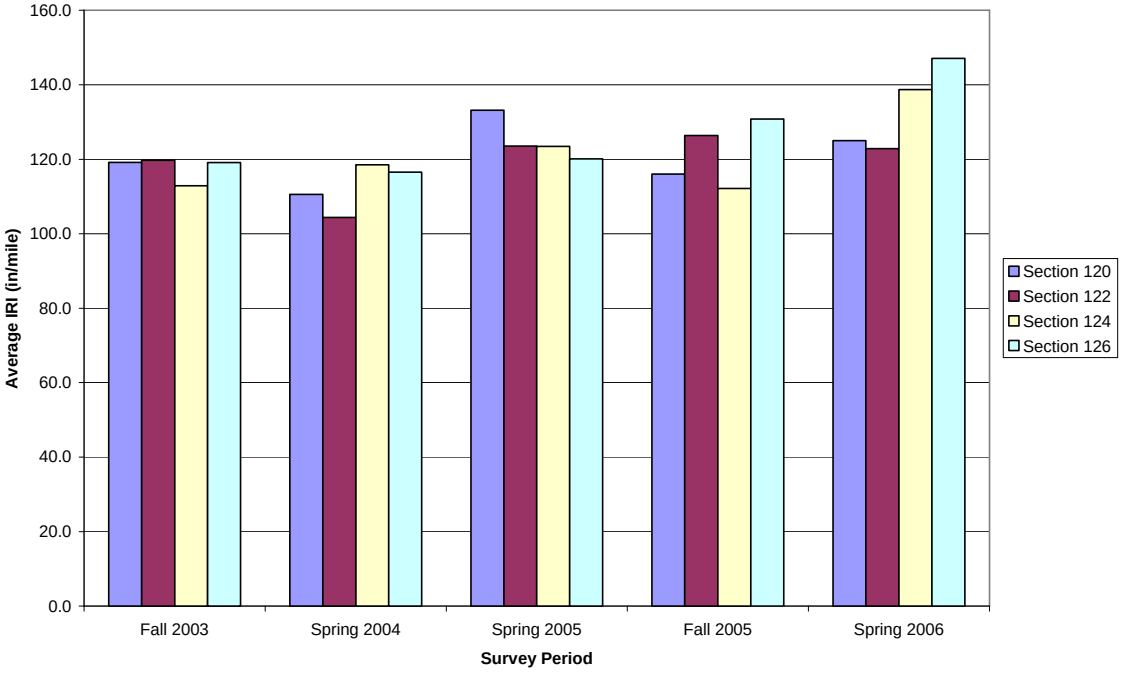

Figure F.86. IRI outside wheel path, 4.5” depth, HMA S. R., fiber C, 9’ panel

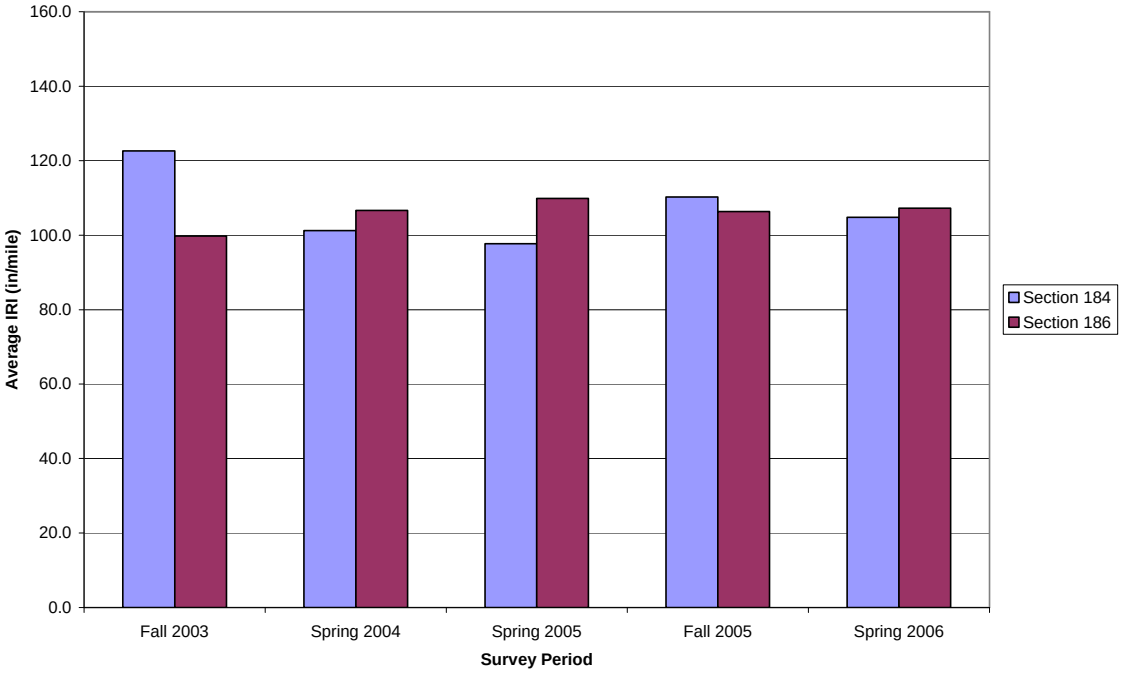

Figure F.87. IRI inside wheel path, 4.5” depth, patch, fiber C, 9’ panel

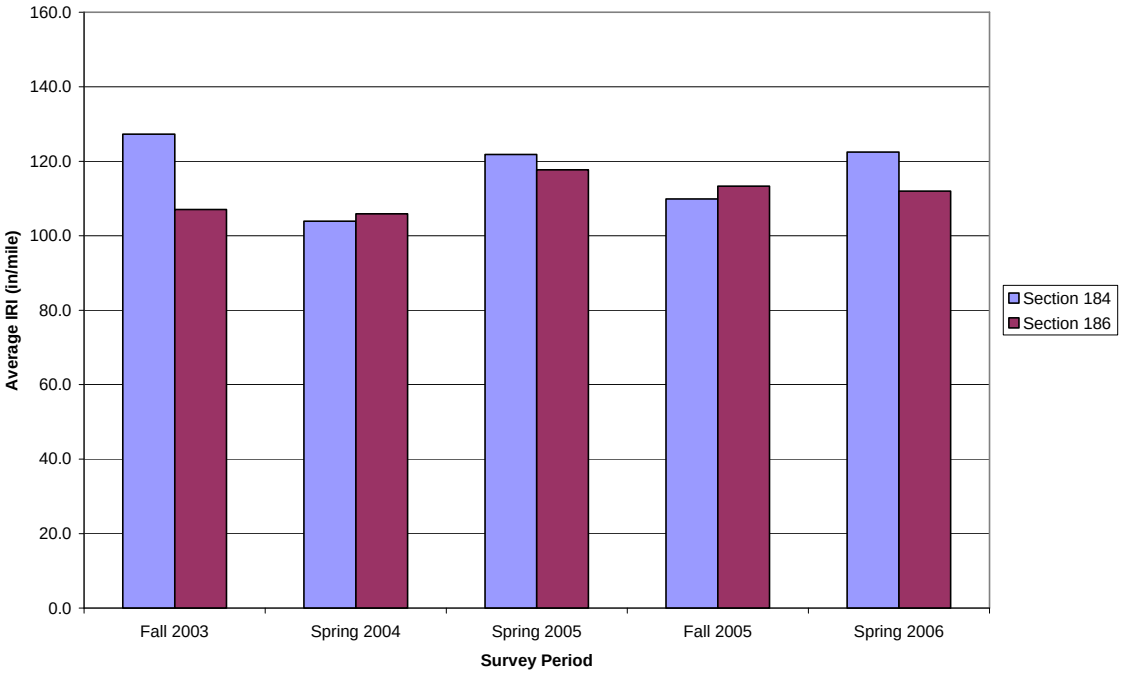

Figure F.88. IRI outside wheel path, 4.5” depth, patch, fiber C, 9’ panel

Table G.1. Soil classification

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
9	52 to 56	51 to 63	Waspie Loam				A-4	54+27			
				0"-11"	Loam	CL, ML, CL-ML					
				11"-29"	Loam, sandy loam, sandy clay	CL, SC, CL-ML, SM-SC			14"-20"	Top 6" dark brown sand with silt	SM
				29"-60"	Gravelly loamy sand, Gravelly sand, sand	SW, SM, SP, SP-SM			20"-40"	Brown to yellowish brown fine sand.	SP
									44"-56"	Top 12" brown to yellowish brown fine sand.	SP
									56"-62"	6" gray sandy silty lenses	SP-SM
									62"-74"	Bottom 12" yellowish brown poorly graded sand.	SP
									102"-122"	Yellowish orange to orangish brown well graded sand.	SW
11	57 to 61	51 to 63	Waspie Loam				A-4	58+24			
				0"-11"	Loam	CL, ML, CL-ML			14"-40"	Brown to yellowish brown fine sand with silt.	SM
				11"-29"	Loam, sandy loam, sandy clay	CL, SC, CL-ML, SM-SC			46"-75"	Yellowish orange well graded sand with some larger particles.	SW
				29"-60"	Gravelly loamy sand, Gravelly sand, sand	SW, SM, SP, SP-SM			144"-166"	Yellowish orange to orange yellow well graded sand with some larger particles.	SW
15	67 to 71	68 to 72	Lawler Loam				A-6, A-7	68+50			
				0"-17"	Loam	CL, ML			12"-38"	Dark brown fine grained sand with yellowish orange well graded sand lenses with some fine gravel.	SW-SM
				17"-28"	Loam, sandy clay loam, clay loam	CL, SC			72"-97"	Brown to yellowish brown well graded sand	SW
				28"-60	Gravelly coarse sand, gravelly loamy sand, loamy coarse sand	SW, GP, SP, SW-SM			107"-117" Saturated	Yellowish brown well graded sand with some larger particles.	SW
									117"-125"	Yellowish brown clayey sand.	SC
									125"-135"	Yellowish brown fine sand with few larger particles.	SP
21	82 to 86	80 to 84	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	81+50			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			14"-24"	Dark brown sandy silt	CL

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			24"-26"	Yellowish/brown sandy clay	CL
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC			26"-36"	Dark brown sandy silt	SC
				41"-60"	Loam, sandy clay loam.	CL,SC			72"-101"	Yellowish/brown sandy clay with gray mottling	ML-CL
									102"-122"	Dark gray sandy clay, massive with some 1/2" particle	CL
		84 to 92	Floyd	0"-22"	Loam	OL, ML, CL	A-6				
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
23	87 to 91		Kenyon Loam					88+50			
		84 to 92		0"-17"	Loam	CL	A-6		12"-38"	Yellowish/brown sandy clay with gray mottling at the top	CL
				17"-54"	Loam, clay loam, sandy clay loam.	CL			41"-66"	Yellowish/orange to brown sandy clay	CL
				54"-60"	Loam	CL					
31	107 to 113	101 to 117	Kenyon Loam				A-6	108+55			
				0"-17"	Loam	CL			48"-73"	Yellowish/orange with gray mottling	CL
				17"-54"	Loam, clay loam, sandy clay loam.	CL			116"-128"	Yellowish/orange with gray mottling	CL
				54"-60"	Loam	CL					
36	125 to 129	121 to 153	Kenyon Loam				A-6	126+80			
				0"-17"	Loam	CL			18"-36"	Yellowish/brown sandy-clay with light gray mottling	CL
				17"-54"	Loam, clay loam, sandy clay loam.	CL			36"-44"	Brown sandy-clay with 1/2" particles	CL
				54"-60"	Loam	CL			56"-63"	Gray-fine sand with clay	CL
									63"-67"	Brownish gray fine sand with silt and organic matter (roots)	CL
									120" Bag sample	Saturated gray sand with clay and yellow clay nodules	CL

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
73	219 to 223	215 to 220	Olin Fine Sandy Loam				A-2, A-4	219+73			
				0"-28"	Fine sandy loam, sandy loam.	SM-SC, SC			13"-37"	Yellowish/brown sandy-clay with gray mottling and particle up to one inch	CL
				28"-46"	Loam, clay loam, sandy clay loam.	CL, SC			48"-72"	Yellowish/brown uniform in color sandy-clay	CL
				46'-60	Loam, clay loam	CL			102"-121"	Brownish/gray clayey-sand, "massive", with particle up to one inch	CL
75	224 to 228	220 to 229	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	226+48	Low elevation potential fill material		
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			16"-43"	Dark brown fine to medium sand	CL, SC
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			47"-53"	Brown sandy clay	SC
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC			53"-70"	Yellow clayey sandy	SC
				41"-60"	Loam, sandy clay loam.	CL,SC			96"-?	Yellow sandy clay (Pinched tube)	SC
									124"-136"	Top-Yellow clay with some sand. Bottom-Fine yellowish/brown clayey sand with few 2" cobbles (possible parent material)	SC
			Floyd	0"-22"	Loam	OL, ML, CL					
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
79	234 to 238	232 to 262	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	234+50			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			12"-36"	Fine dark brown sand with yellow/orangish clay pockets(nodules). Less than 5% large aggregate approximately one inch.	ML
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			44"-53"	Dark brown medium to fine sand (homogeneous)	SM-SC
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC			53"-57"	Medium brown medium to fine sand (homogeneous)	SC
				41"-60"	Loam, sandy clay loam.	CL,SC			57"-71"	Dark brown medium to fine sand (homogeneous)	SC
										Yellow medium to coarse sand	SW

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
			Floyd	0"-22"	Loam	OL, ML, CL					
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
85	249 to 253	232 to 262	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	252+81			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			12"-39"	Dark grayish/brown fine sand with large clay nodules gray in color	CL
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			72"-76"	Yellow sandy clay	CL
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC			76"-86"	Yellow clay with medium sand and gravel. Some mottling gray in color, possibly calcic	CL,SC
				41"-60"	Loam, sandy clay loam.	CL,SC			102"-113"	Yellow clay and very fine sand, bottom 1"-2" very fine cemented sand (possible bedrock or parent material)	CL.SC
			Floyd	0"-22"	Loam	OL, ML, CL					
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
93	270 to 274	271 to 280	Kenyon Loam				A-6	275+22			
				0"-17"	Loam	CL			22"-47"	Light brown to yellowish brown, sandy lean clay with particle coatings, minor modeling (yellowish brown with gray patches). Fine gravel to coarse sand increasing with depth of sample.	CL

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
					Loam, clay loam, sandy clay loam.	CL			67"-89"	Oxidized to un-oxidized transition 10" from the top of the sample. Light yellowish brown to dark gray in color, well modeled with gravel up to 1 inch in size. Fractures present in the parent material which indicates coated oxidized flow paths.	CL
				17"-54"							
				54"-60"	Loam	CL			101"-125"	Dark gray stiff clay (un-oxidized glacial till) below the water table. "Massive" Particle with a maximum size up to one inch. Very little sand.	CL
98	280 to 284	280 to 283	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	282+31			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			39" Bag sample	Yellowish/brown clean medium poorly graded sand	SP, SC
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			70"-95"	Yellowish/gray sandy clay with large gravel (2"-3")	CL,SC
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC					
				41"-60"	Loam, sandy clay loam.	CL,SC					
		283 to 287	Floyd	0"-22"	Loam	OL, ML, CL	A-6				
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
118	330 to 334	329 to 332	Colo-Ely Complex				Colo A-4, A-6, Ely A-7, A-6	331+48			
			Colo	0"-18"	Silty loam	CL,CL-ML			13"-16"	Medium brown fine sand	CL-ML
				18"-47"	Silty clay loam	CL,CH			16"-22"	Yellow brown to brown very clean sand	CL
				47"-60"	Silty clay loam, clay loam, silt loam	CL,CH			22"-37"	Dark brown sandy-silt to dark brown sandy clay towards the bottom	CL, ML
									66"-91"	Dark brown sandy-silt with lots of organic matter (possible fill material)	OH
			Ely	0"-26"	Silty clay loam	CL, OH, MH			104"-133"	Black/dark gray sandy-silt with lots of organic matter (possible top soil)	OH

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
122	340 to 344	341 to 344	Fayette Silt Loam	26"-49"	Silty clay loam	CL, ML	A-4, A-6	342+90			
				49"-60"	Silt loam, silty clay loam, loam.	CL					
				0"-12"	Silt loam.	CL-ML, CL			16"-28"	Yellowish/brown with mottling gray in color, blocky structure	CL,ML
				12"-46"	Silty clay loam, clay loam	CL			28"-41"	Dark brown clayey silt	CL-ML
				46"-60"	Silt loam	CL			67"-75"	Dark brown clayey silt	CL-ML
									75"-83"	Yellowish/brown with mottling gray in color, blocky structure	CL
									102"-127"	Light gray very fine sandy-silt with iron oxide staining	CL,ML
144	395 to 399	396 to 405	Basset Loam				A-4, A-6	396+50			
				0"-12"	Loam	CL, CL-ML			12"-26"	Yellowish/brown well graded sand	CL
				20"-42"	Loam, fine sandy loam.	CL			26"-38"	Yellowish/brown sandy-clay with gray mottling	CL-ML
				42"-60"	Loam	CL			42"-71"	Dark gray clay with sand and gravel, "massive"	CL
									96"-124"	Dark gray lean clay with sand.	CL
164	445 to 449	431 to 457	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	448+50			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			10"-31"	Light brown to yellowish/brown sandy-silt, "mottled"	ML
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			51"-75"	Light gray very fine sandy/silt with iron oxide staining	ML
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC			104"-?	Light gray to light brown sandy-silt with orangish sand seams	ML
				41"-60"	Loam, sandy clay loam.	CL,SC					
			Floyd	0"-22"	Loam	OL, ML, CL					
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
166	450 to 454	431 to 457	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	452+00			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			12"-Rock	Yellowish/brown sandy silt with stiff platy structure	ML
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			96" Bag sample	Yellowish/brown sandy silt with stiff platy structure	ML
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC					
				41"-60"	Loam, sandy clay loam.	CL,SC					
			Floyd	0"-22"	Loam	OL, ML, CL					
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
186	495+50 to 499+50	495 to 498	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	498+00			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH					
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			12"-25"	Yellowish sandy clay with light gray mottling and gravel up to 3/4"	CL
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC			25"-27"	Brownish/yellow sandy clay	SC
				41"-60"	Loam, sandy clay loam.	CL,SC			42"-57"	Dark brown fine to coarse sandy clay	CL
		498 to 504					A-6		57"-66"	Dark brown fine sandy clay with 2" seam of yellowish brown fine sand	CL
			Floyd	0"-22"	Loam	OL, ML, CL			104"-129"	Dark brown fine to coarse sandy clay	CL
				22"-30"	Sandy clay loam, loam.	CL					
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
189	500+50 to 506+50	504 to 507	Clyde-Floyd Complex				Clyde A-7, Floyd A-6, A-7	501+50			
			Clyde	0"-23"	Clay loam	OL, MH, ML, OH			12"-27"	Medium brown fine sand	CL
				23"-34"	Clay loam, loam, silty clay loam.	CL, ML			27"-29"	Yellowish/brown sandy clay	CL

Test Section	Stations	Soil Classification									
		USDA Classification					AASHTO Classification	Visual Classification			
		Stations	Soil Name	Sample Depth	USDA Texture	Unified		Stations	Sample Depth / Size	Visual Description	Visual Classification (unified)
				34"-41"	Sandy loam, loam, sandy clay loam.	SM, SM-SC			29"-37"	Dark brown fine to medium sand with silt and grayish/green clay lenses	CL
				41"-60"	Loam, sandy clay loam.	CL,SC			44"-69"	Dark brown/gray silty clay with organic material (possible fill material)	SC
									99"-101"	Brown medium sandy clay	CL
			Floyd	0"-22"	Loam	OL, ML, CL			101"-110"	light yellowish/brown sandy clay with gray mottling	CL
				22"-30"	Sandy clay loam, loam.	CL			110"-122"	Grayish sandy clay with gravel up to one inch	CL
				30"-36"	Sandy loam, loamy sand	SM, SM-SC					
				36"-60"	Loam, clay loam, sandy clay loam.	CL					
191	507+60 to 513+70	507 to 510	Kenyon Loam				A-6	509+60			
				0"-17"	Loam	CL			16"-42"	Dark brown medium sand with 2" yellow sand seam 10" from top	CL
				17"-54"	Loam, clay loam, sandy clay loam.	CL			34"-40"	Dark brown clean sand	CL
				54"-60"	Loam	CL			96" Bag sample	Yellow fine to medium sand, "saturated"	CL