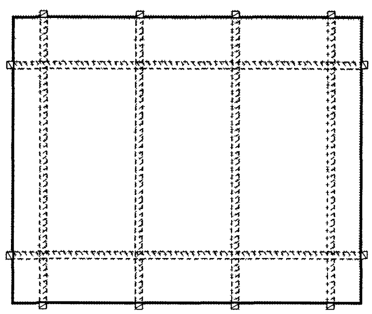
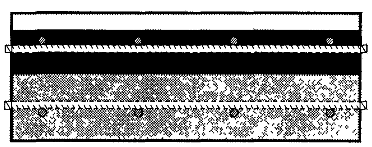
INTERIM REPORT

FIELD EVALUATION OF CORROSION INHIBITORS FOR CONCRETE: INTERIM REPORT 1: EVALUATION OF EXPOSURE SLABS REPAIRED WITH CORROSION INHIBITORS





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Supplementary Notes

Abstract

One hundred and fifty-six exposure slabs have been constructed with and without a variety of combinations of corrosion inhibiting admixtures and topically applied inhibitors. To accelerate corrosion one hundred and thirty-six of the slabs were constructed with concrete that surrounded the top mat of reinforcement with chloride contents of 3, 6, 10, and 15 lb/yd^3 (1.8, 3.5, 5.9, and 8.9 kg/m^3). This paper presents the results from measurements made on the slabs in May 1998 after approximately 1 year of exposure. The measurements show that as the chloride ion content in the slabs increases, the macrocell current, macrocell potential, half-cell potential, and rate of corrosion increase and the resistance decreases. Macrocell currents exceed 10 μA, indicating corrosion activity, in slabs cast with chloride in the concrete except those with 3 lb/yd^3 (1.8 kg/m^3) of chloride that were overlayed and patched or patched. Measurements taken to determine the rate of corrosion indicate high, moderate, low, and passive states of corrosion in 63, 22, 12, and 3 percent, respectively, of the slabs. The measurements also show no significant difference between the slabs repaired with and without corrosion inhibitor admixtures and topical treatments. Slabs repaired with 7% silica fume showed half-cell potentials that were less negative than those repaired without silica fume.

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(The opinions, findings, and conclusions expressed in this report are those of the authors and not necessarily those of the sponsoring agencies.)

Virginia Transportation Research Council
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University of Virginia)

Charlottesville, Virginia

December 1998
VTRC 99-IR1

ABSTRACT

One hundred and fifty-six exposure slabs were constructed with and without a variety of combinations of corrosion-inhibiting admixtures and topically applied inhibitors. To accelerate corrosion, 136 of the slabs were constructed with concrete that surrounded the top mat of reinforcement with chloride contents of 3, 6, 10, and 15 lb/yd^3 (1.8, 3.5, 5.9, and 8.9 kg/m^3). This report presents the results from measurements made on the slabs in May 1998 after approximately 1 year of exposure.

The measurements show that as the chloride ion content in the slabs increases, the macrocell current, macrocell potential, half-cell potential, and rate of corrosion increase and the resistance decreases. Macrocell currents exceed 10 μA, indicating corrosion activity, in slabs cast with chloride in the concrete except in those with 3 lb/yd^3 (1.8 kg/m^3) of chloride that were overlaid and patched or patched. Measurements to determine the rate of corrosion indicated high, moderate, low, and passive states of corrosion in 63, 22, 12, and 3 percent, respectively, of the slabs. The measurements also showed no significant difference between slabs repaired with and without corrosion inhibitor admixtures and topical treatments. Slabs repaired with 7% silica fume showed half-cell potentials that were less negative than those repaired without silica fume.

INTERIM REPORT

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INTRODUCTION

Various types of corrosion inhibitors have been developed and marketed to mitigate continued corrosion in newly rehabilitated structures. When physical damage is repaired, these materials are usually incorporated into the repair procedure by applying them to the surface of the original concrete and allowing them to penetrate before patching, including them as an admixture in the patch material, or both. The applications add relatively little work to the conventional repair activity. Construction costs are low compared to those of alternative corrosion protection treatments, and there are essentially no future maintenance costs directly associated with inhibitors. However, the question of whether inhibitor performance meets expectations with minimal side effects remains to be answered.

A national pooled fund study was initiated in August 1996[1] to evaluate the long-term performance of structures and exposure slabs that were to be patched and overlaid with concrete containing corrosion-inhibiting admixtures and that were treated with topical applications of inhibitors. The study includes the evaluation of 156 exposure slabs, four bridge decks with overlays, and a patched bridge substructure. The estimated cost for the 5-year study is $250,000. The DOTs contributing to this project are Florida, Illinois, Iowa, Kansas, Maryland, Minnesota, Montana, Nebraska, New Jersey, New York, North Carolina, Virginia, and Wisconsin.

This interim report presents the results obtained from measurements done in May 1998 on 136 slabs after approximately 1 year of exposure. Twenty full-depth slabs are being ponded and are not actively corroding at this time.

METHODOLOGY

One hundred and fifty-six slabs were fabricated in VTRC's laboratory. The four slab designs are shown in Figure 1. Twenty slabs were designed to simulate new construction and are being ponded with 3% NaCl solution (2-week wet and 2-week dry cycle) as shown in Figure 1. Forty-eight slabs were fabricated with either 3, 6, 10, or 15 lb/yd^3 (1.8, 3.5, 5.9, and 8.9 kg/m^3) of chloride in the concrete cast into the top portion of the slab prior to receiving an overlay 1.25 in (32 mm) thick. Fifty-two slabs were fabricated with either 3, 6, or 10 lb/yd^3 (1.8, 3.5, and 5.9 kg/m^3) of chloride in the concrete cast into the top portion of the slab before being patched and overlaid. Thirty-six slabs were fabricated with either 3, 6, or 10 lb/yd^3 (1.8, 3.5, and 5.9 kg/m^3) of chloride in the concrete cast into the top portion of the slab before being patched. The concrete mixing schedule and mixture proportions are shown in Tables 1 through 4.

Full-depth slabs, overlays, and patches were cast with concrete containing either an inorganic inhibitor, DCI (4 gal/yd^3 [20 l/m^3]); an organic inhibitor, Ferrogard 901(2 gal/yd^3 [10 l/m^3]); or Rheocrete 222 (1 gal/yd^3 [5 l/m^3]). Before being patched or overlaid, some slabs received three applications of a topical inorganic inhibitor, Postrite (P) ([125 ft^2/gal (3.1 m^2/l]), or two applications of an organic inhibitor, Ferrogard 903 (300 ft^2/gal [7.4 m^2/l]). The surfaces treated with Ferrogard 903 were power washed before being patched and overlaid.

Some repairs were done with concrete containing Type I/II portland cement (PC) and some with concrete containing PC and 7% silica fume by weight of cement (7% SF). Slabs constructed with 3, 6, and 10 lb/yd^3 (1.8, 3.5, and 5.9 kg/m^3) chloride were overlaid and patched approximately 3 months after being cast. Slabs constructed with 15 lb/yd^3 (8.9 kg/m^3) chloride were overlaid 9 months after being cast.

The following measurements are being made on the 156 slabs each quarter:

- macrocell current, between top and bottom rebar mats (mA), measured with 10 ohm resistor
- macrocell potential (mV), measured immediately after disconnecting the top and bottom rebar mats
- resistance between top and bottom rebar mats (ohms), measured using a Nilsson Model 400 soil resistance meter using the two-pin method
- half-cell potentials for bars b and d (mV [CSE]) (ASTM C 876)
- rate of corrosion for bar b (mils per year), measured using the PR monitor.

RESULTS

Results of tests for compressive strength, permeability to chloride ion, and freeze-thaw durability are shown in Tables 5 through 7. The 28-day compressive strength of all mixtures except the one with Catexol 1000 exceeded the requirement for bridge deck concrete of 30 MPa (4,350 psi). Permeability values ranged from negligible for a "rapid set" repair to high for repairs with DCI-5. All mixtures failed the freeze-thaw test outlined in ASTM C6566, Procedure A.

The results of corrosion measurements in May 1998 after approximately 1 year of exposure are shown in Tables 8 through 13 and summarized in Figures 2 through 8. Figures 9 through 14 compare measurements done in May 1998 on the slabs that were repaired with inhibitors to measurements done on slabs repaired without inhibitors from the standpoint of percentage of readings that support less corrosion than the control slabs (no inhibitors).

The following conclusions were drawn from the measurements taken in May 1998:

Macrocell Current:

- Current increases as chloride content increases.
- Macrocell currents exceed 10 μA, indicating corrosion (ASTM G 109) in the slabs cast with chloride in the concrete except those with only 3 lb/yd^3 (1.8 kg/m^3) of chloride that were overlaid and patched or patched.
- No significant difference between slabs with and without inhibitors.

Macrocell Potential:

- Potential becomes more negative as chloride content increases.
- No significant difference between slabs with and without inhibitors.

Resistance:

- Resistance decreases as chloride content increases.
- Resistance decreases with addition of inhibitors.

Half-Cell Potentials (ASTM C 876):

- Potentials become more negative as chloride content increases.
- Measurements indicate no or uncertain corrosion activity for most of the slabs.
- No significant difference with or without inhibitors.

Rate of Corrosion:

- Rate increases as chloride content increases.

- Measurements indicate high (> two mpy), moderate (1 to 2 mpy), low (0.2 to 1 mpy), and passive (< 0.2 mpy) states of corrosion in 63, 22, 12, and 3 percent of the slabs, respectively.

- No significant difference for slabs with and without inhibitors except for slabs with DCI and 3 and 6 lb/yd^3 chloride, which were associated with lower rates than the control slabs.

CONCLUSIONS

1. Corrosion activity increases with an increase in chloride content.

2. Slabs cast with chloride in the concrete surrounding the top mat of reinforcement are actively corroding after 1 year of exposure.

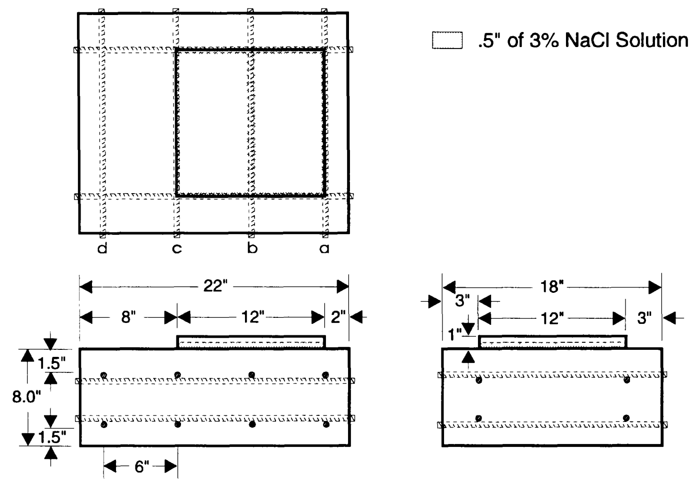
3. After 1 year of exposure, there is no difference in corrosion activity between slabs repaired with and without corrosion-inhibiting admixtures and topical treatments.

REFERENCE

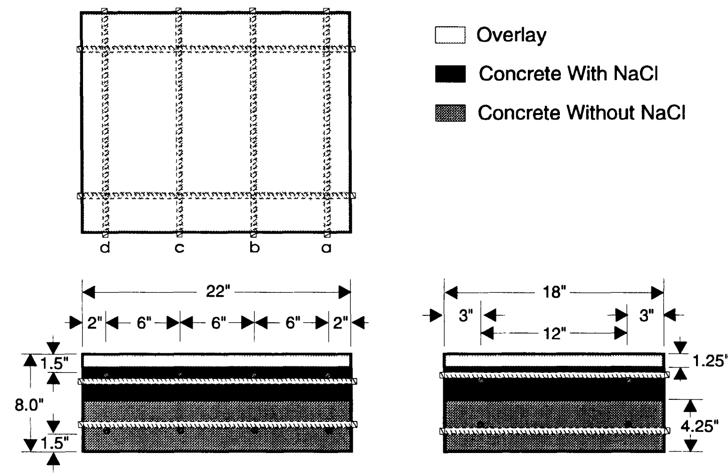
1. Michael Sprinkel, Gerardo Clemeña, and Celik Ozyildirim. *Field Evaluation of Corrosion Inhibitors for Concrete.* VTRC 97-RP6, National Pooled Fund Study No. SPR-2 (184) (S-95-7). Virginia Transportation Research Council, Charlottesville, August 1996.

APPENDIX

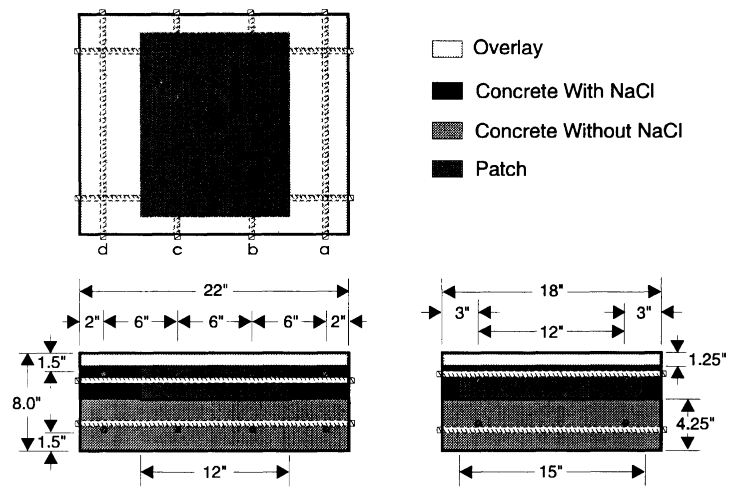
This appendix includes the figures and tables that are available from the Virginia Transportation Research Council.



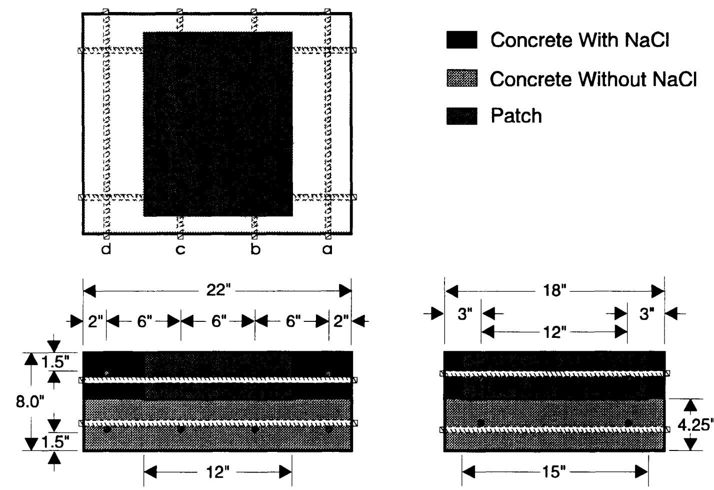
Full depth exposure slab



Slab with 1.25 inch overlay



Slab with 1.25 inch Overlay and Patch



Slab with patch

Figure 1. Slab Designs (1 in. = 25.4 mm)

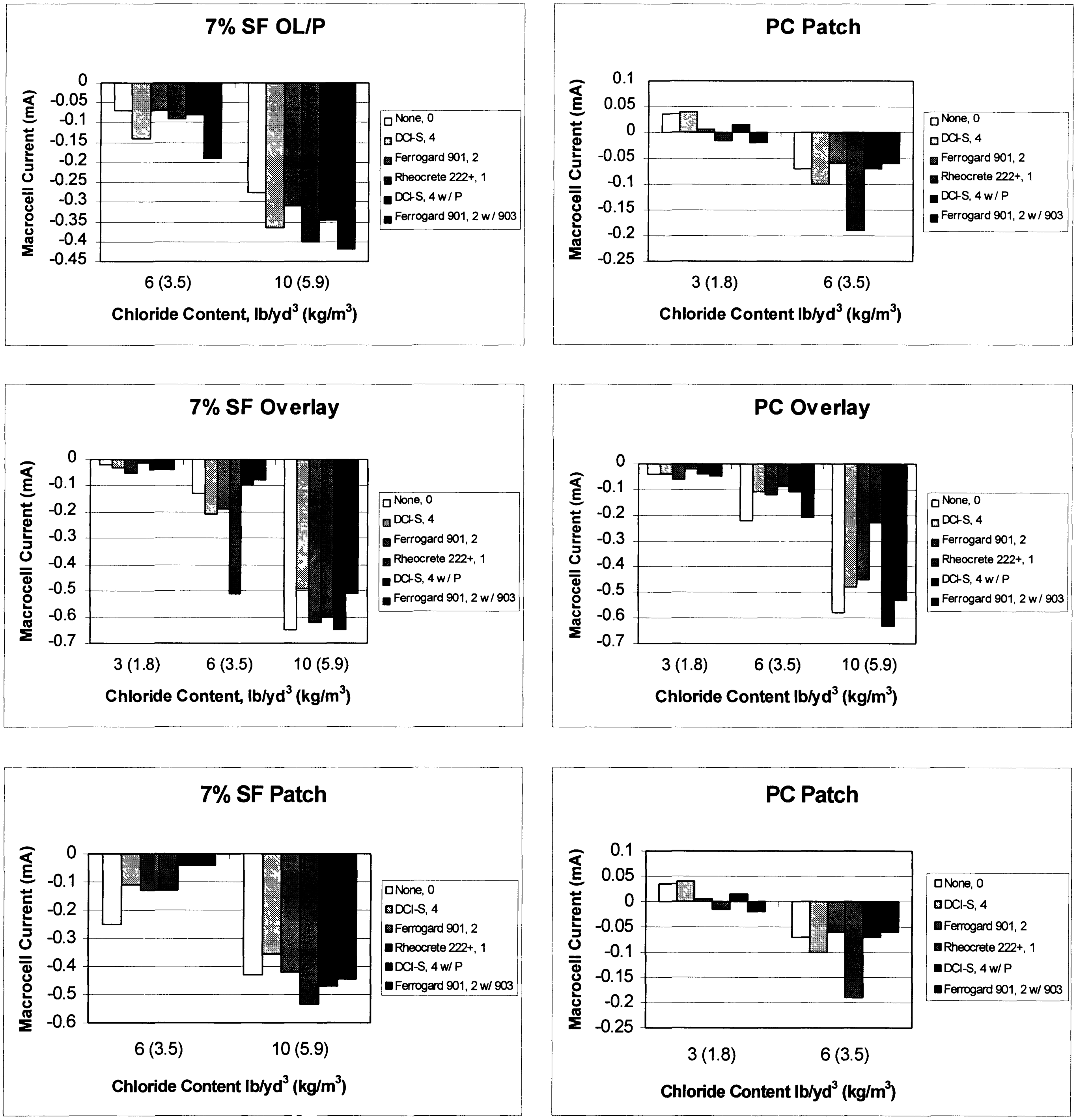


Figure 2. Macrocell current measurements.

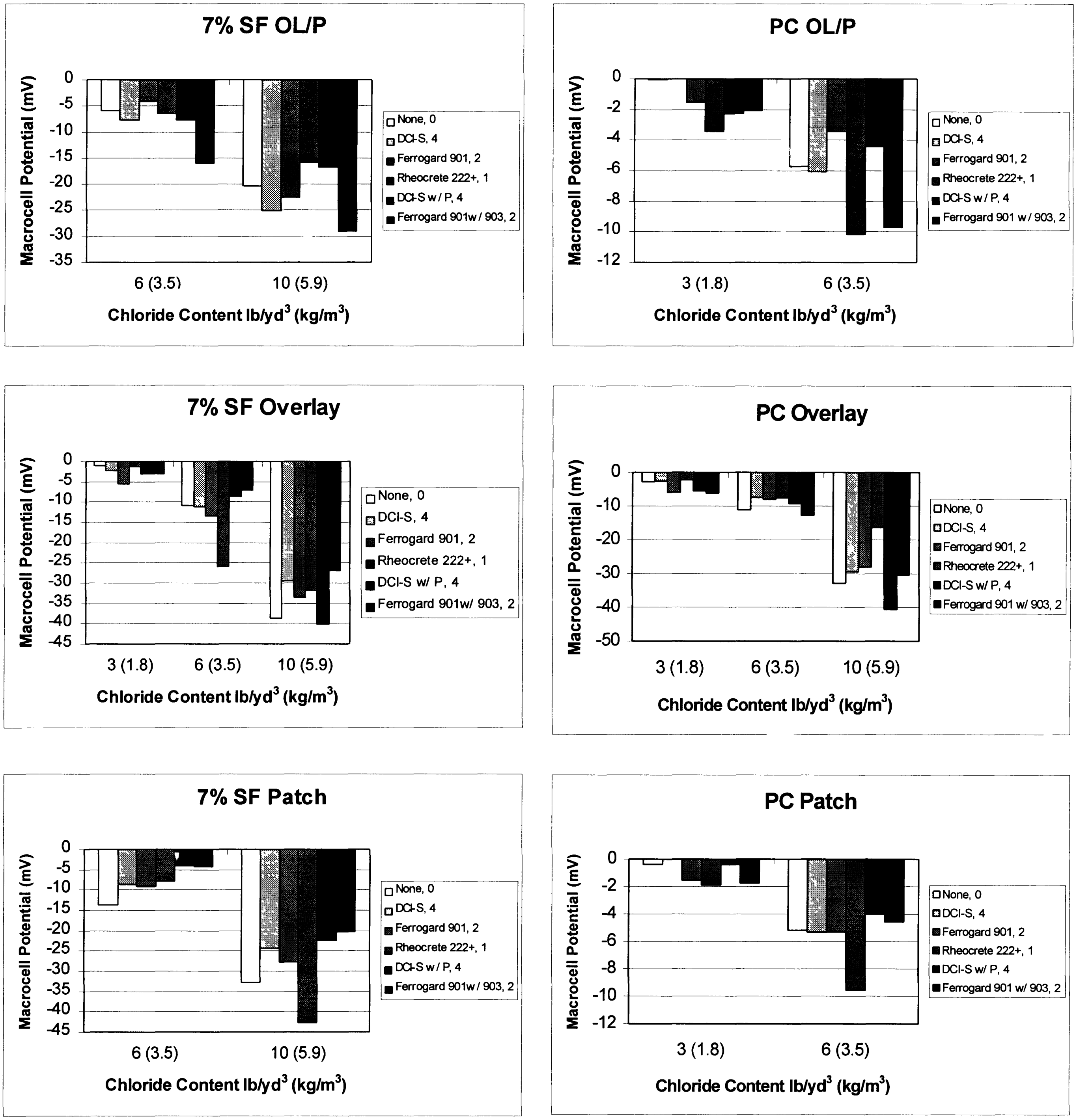


Figure 3. Macrocell potential measurements.

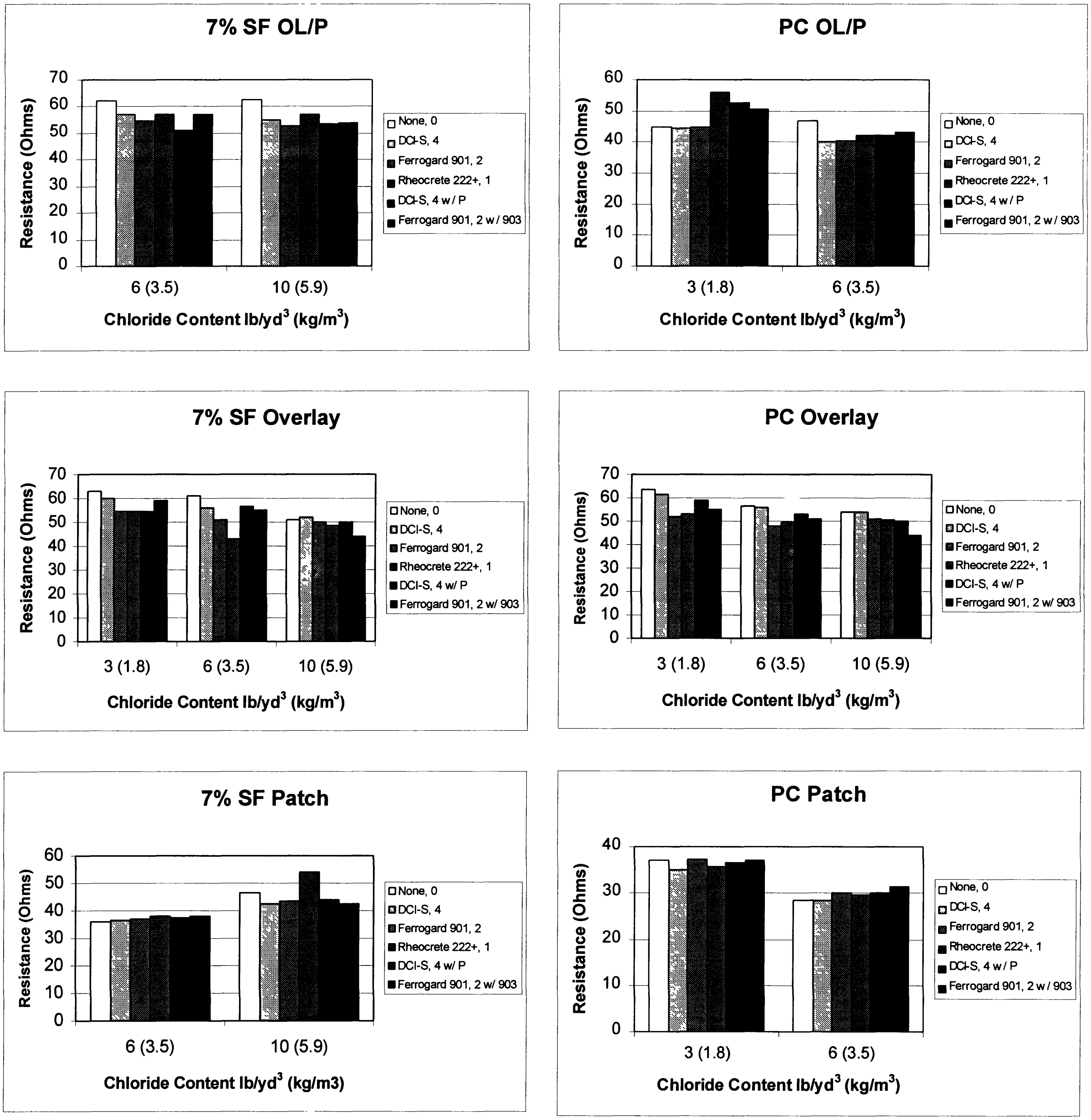


Figure 4. Resistance measurements.

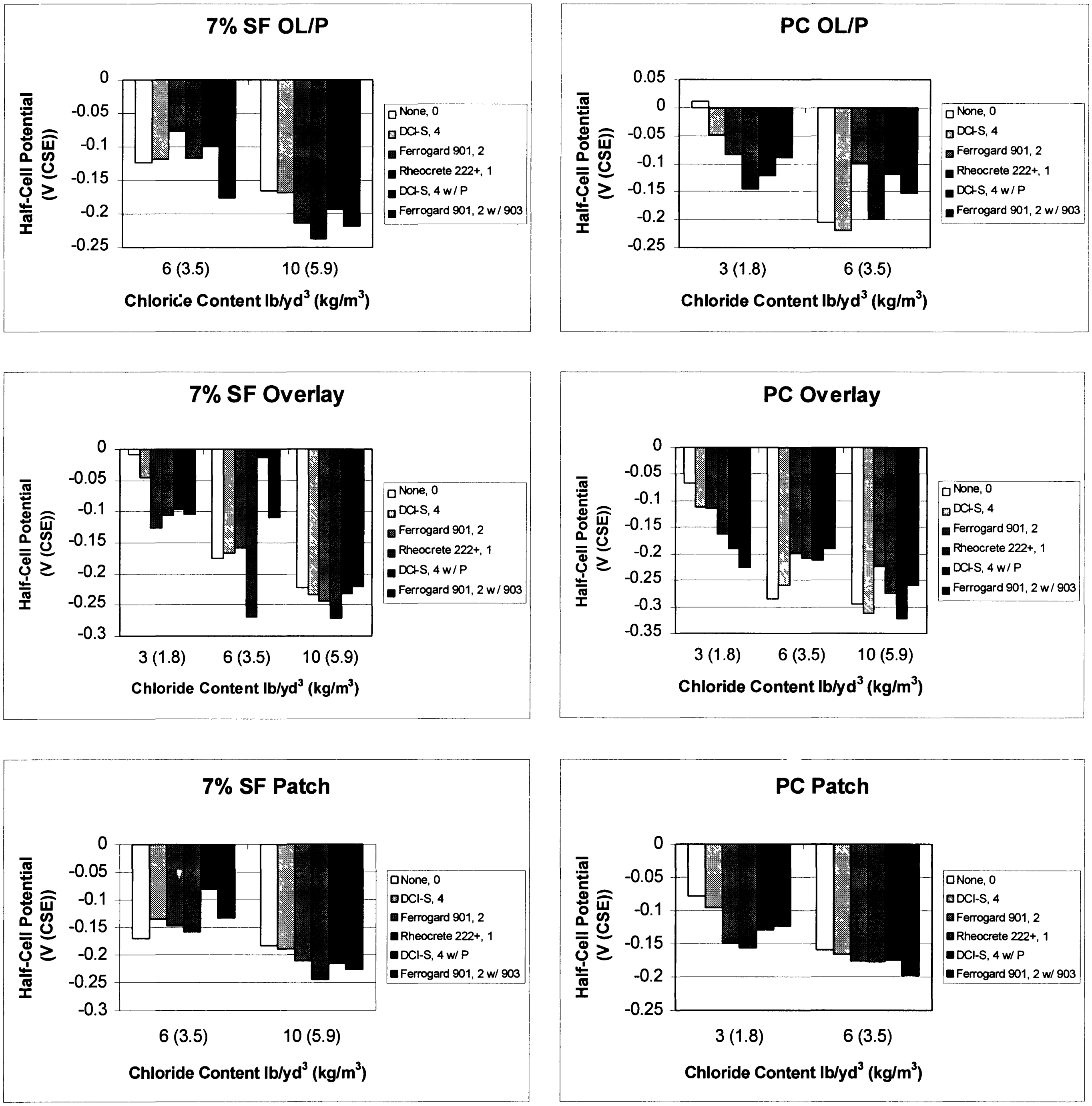


Figure 5. Open circuit potential measurements by half-cell meter

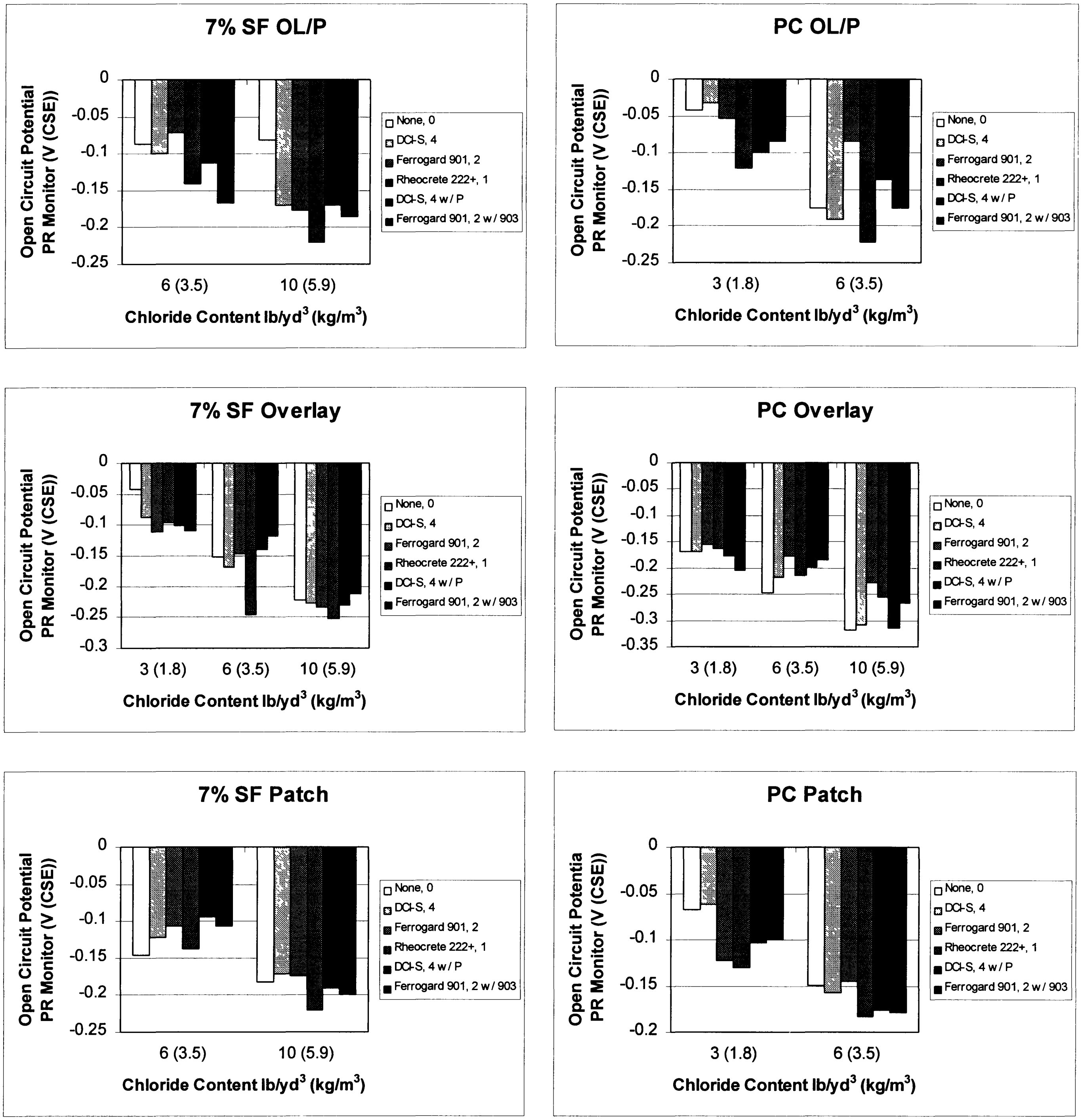


Figure 6. Open circuit potential measurements by PR monitor.

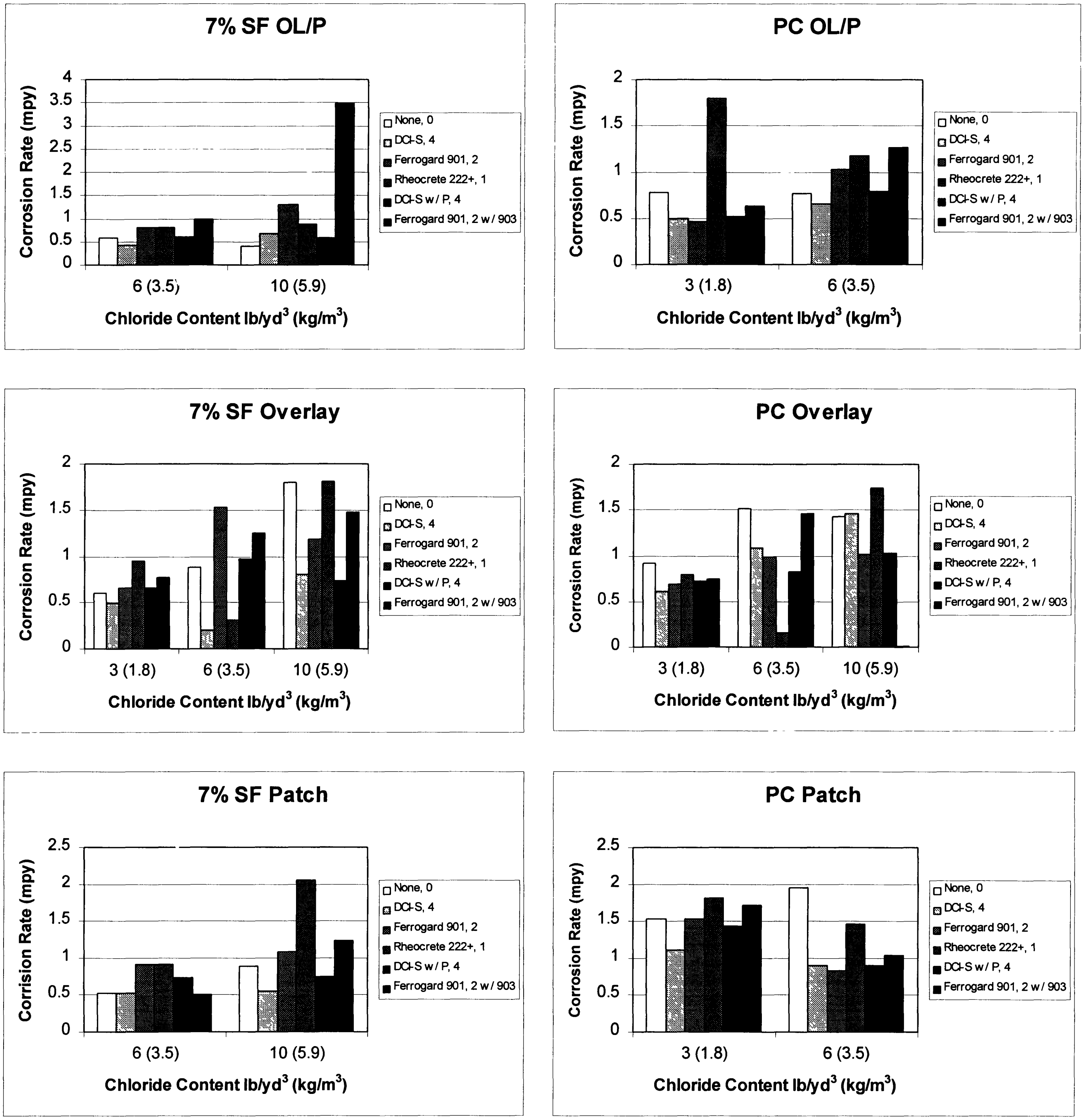


Figure 7. Rate of corrosion measurements by PR Monitor.

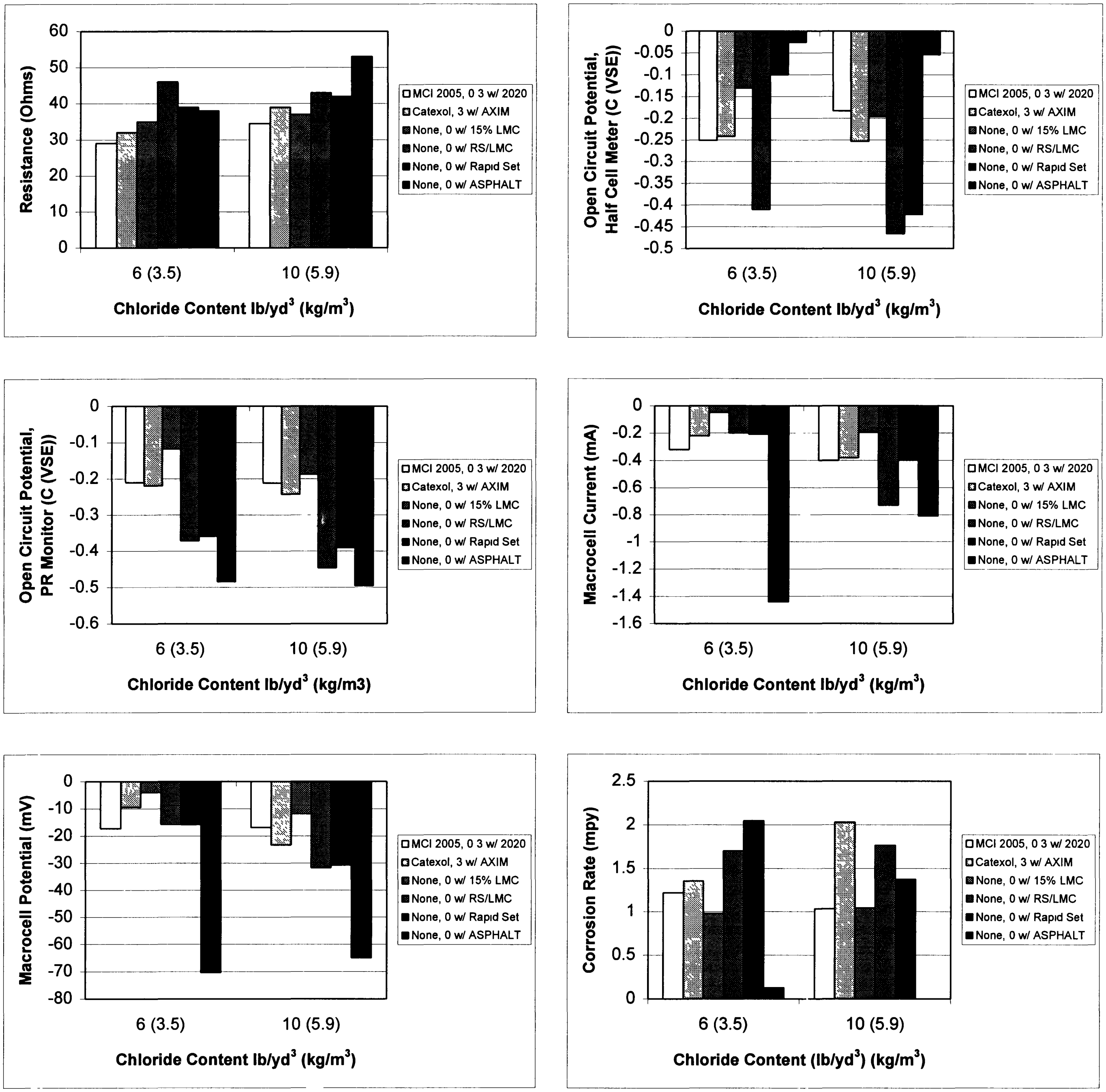


Figure 8. Measurements done on slabs OL/P with special mixtures

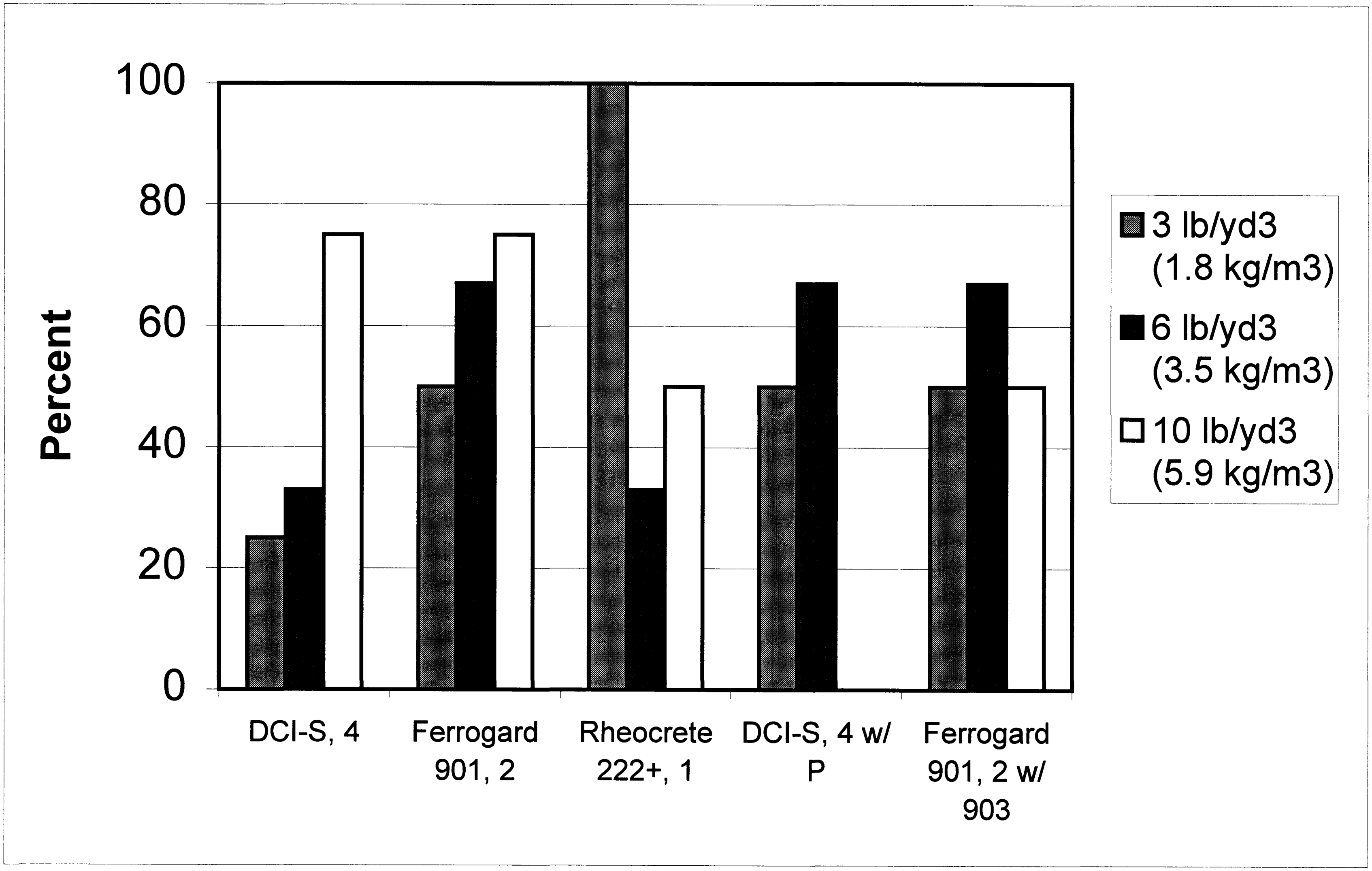


Figure 9. Percent of macrocell current measurements less negative than for the control slab.

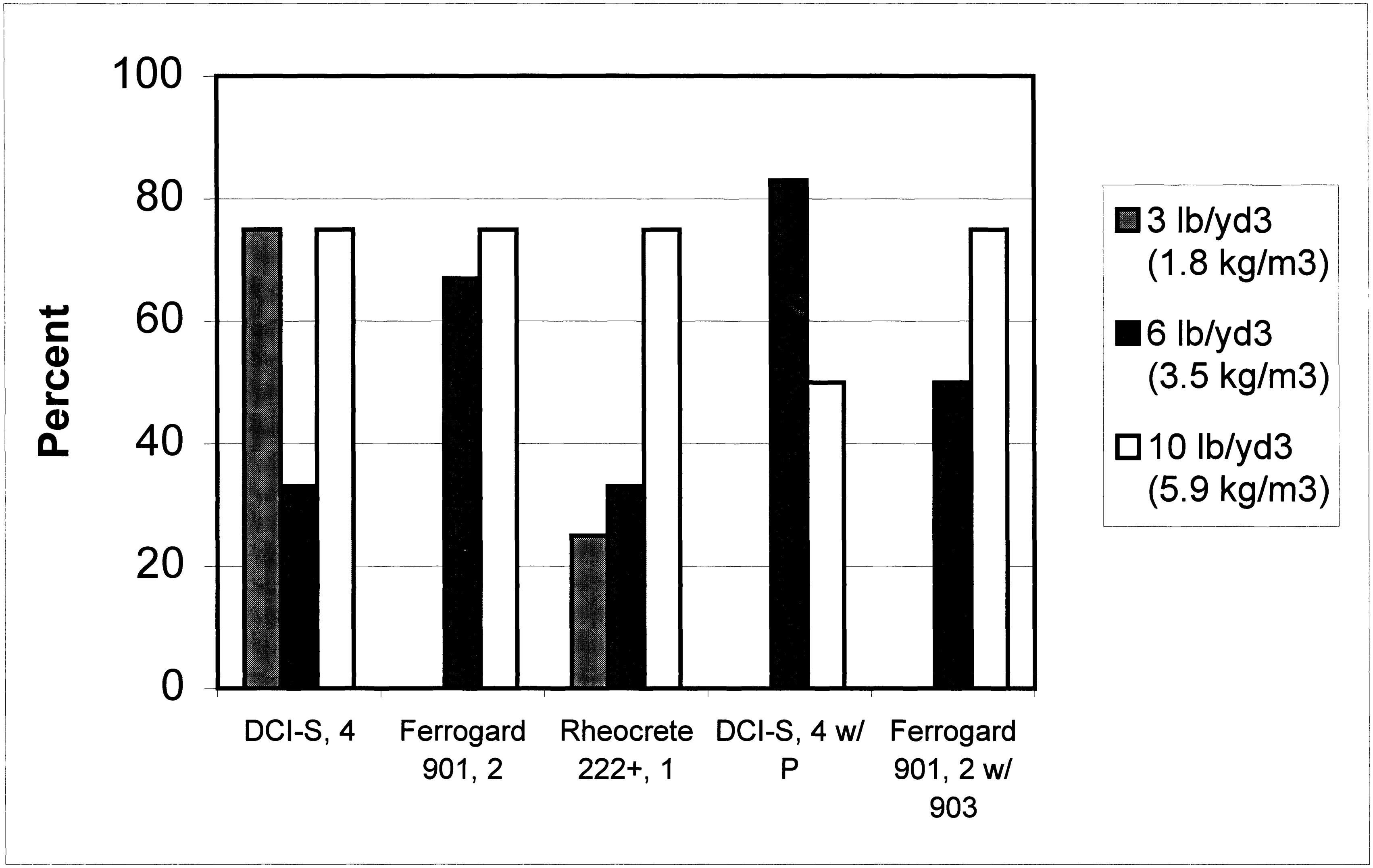


Figure 10. Percentage of macrocell potential measurements less negative than for the control slab.

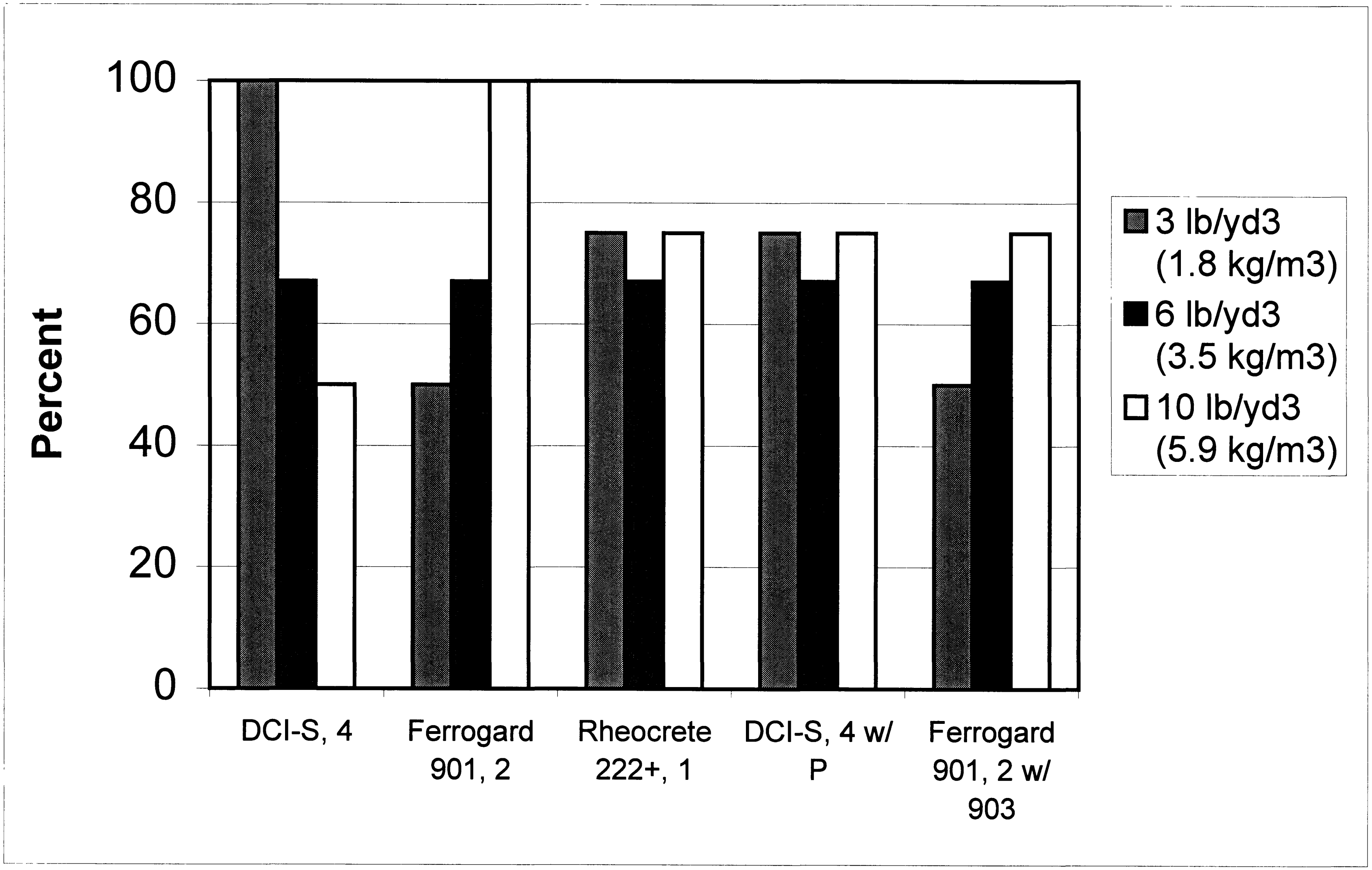


Figure 11. Percentage of resistance measurements less than for the control slab.

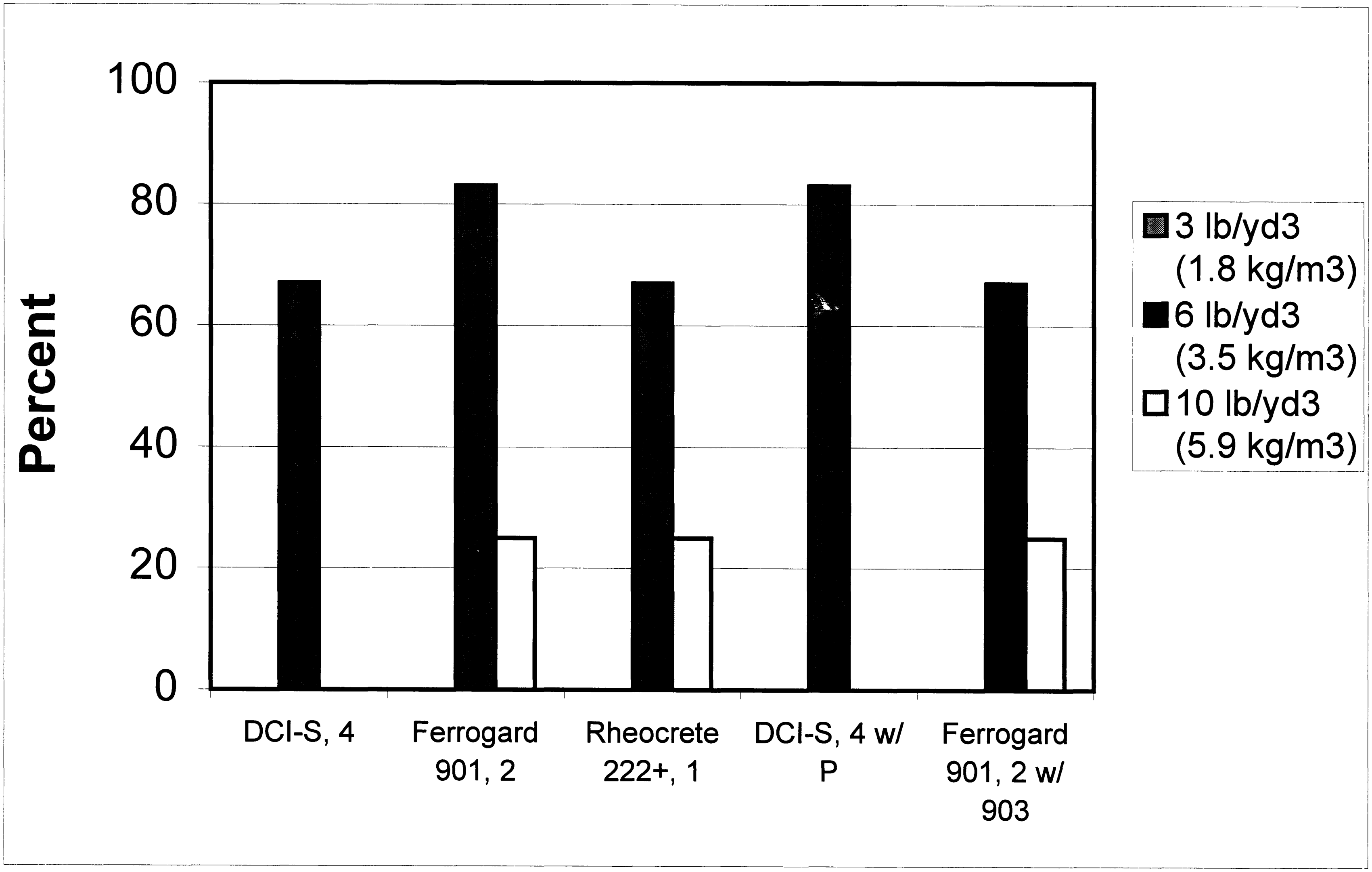


Figure 12. Percentage of open circuit potential readings by half cell meter less negative than for the control slab.

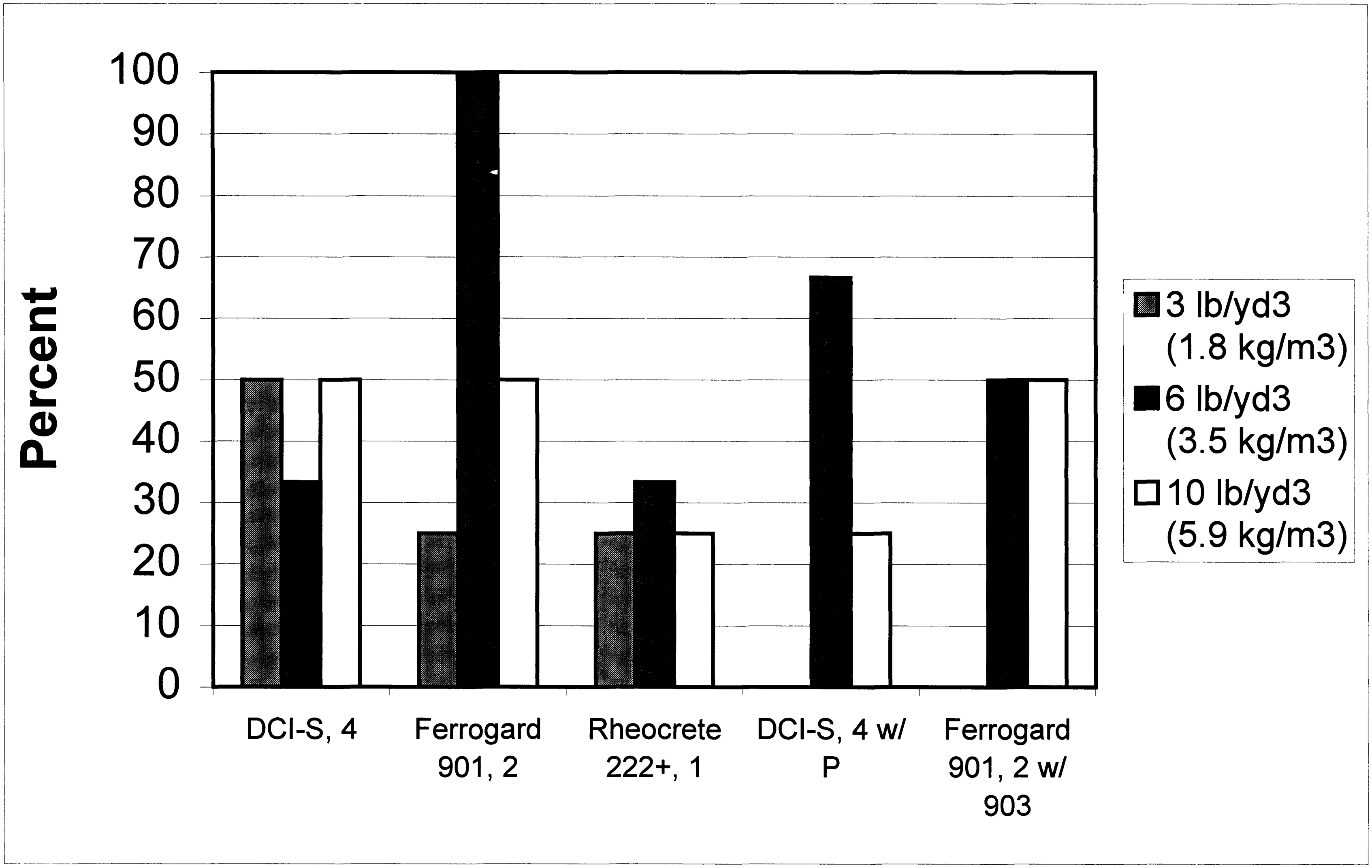


Figure 13. Percentage of open circuit potential readings by PR monitor less negative than for the control slab.

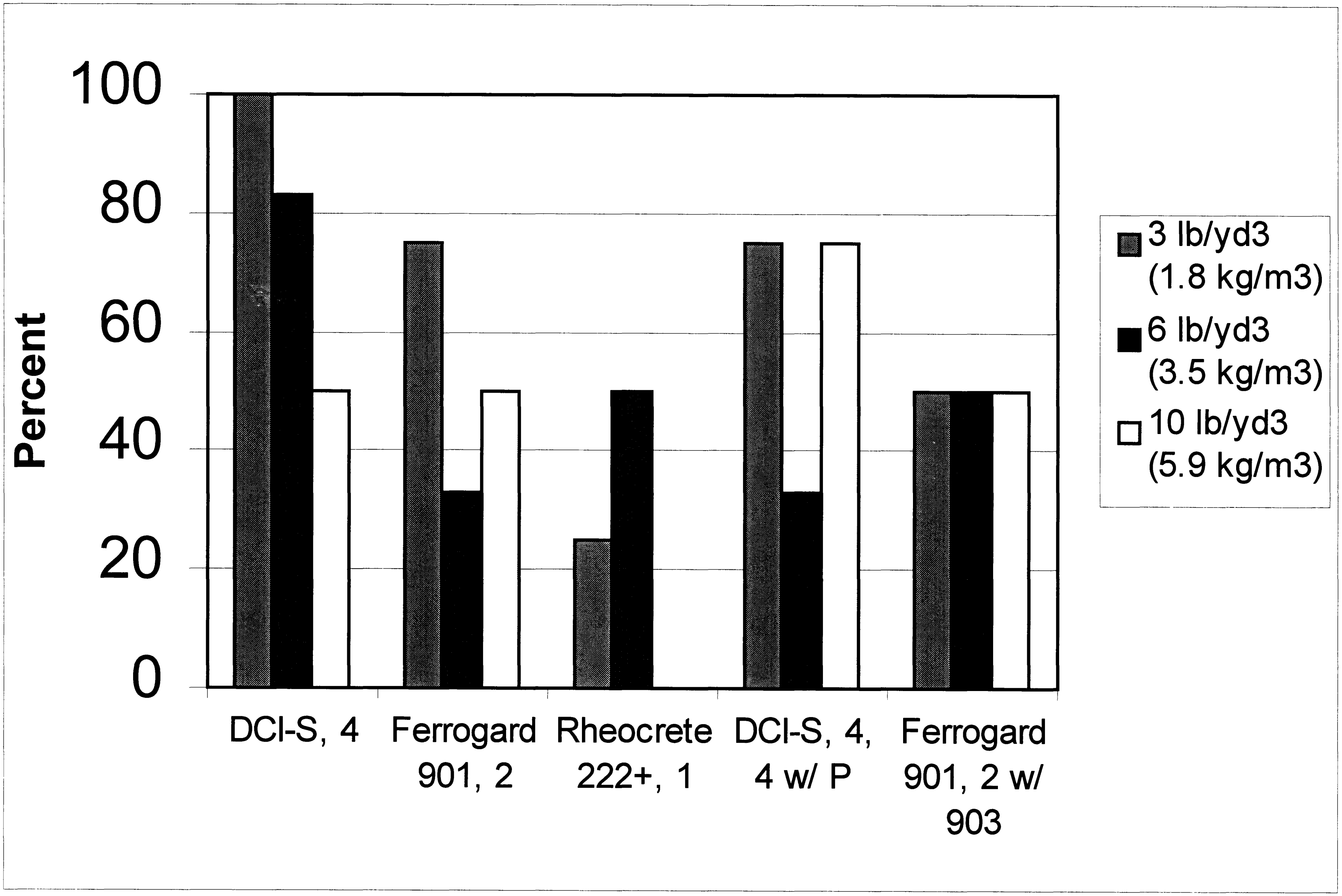


Figure 14. Percent of corrosion rate measurements less than for the control slab.

Table 1: Corrosion inhibitor admixture mixing schedule and mixture details, repaired slabs

			Base Mix Properties									
Box	Base	chl,	w/o Chl.		w/ Chl.		Type	Repair	Type Repair	Type, dosage	Repair Mix Prop.	
Number	Mix Date	pcy	Sl., in.	Air, %	Sl., in.	Air, %	Repair	Mix Date	Concrete	CIA, gcy	Sl., in.	Air, %
1	12/10/96	3	3.5	5.7	4.0	5.7	Overlay	4/1/97	PC	None, 0	5.0	6.4
2	12/10/96	3	3.5	5.7	4.0	5.7	Overlay	4/2/97	7% SF	None, 0	4.0	6.5
3	12/10/96	3	3.5	5.7	3.5	5.7	Overlay	4/1/97	PC	DCI-S, 4	5.0	7.4
4	12/10/96	3	3.5	5.7	3.5	5.7	Overlay	4/2/97	7% SF	DCI-S, 4	4.0	6.5
5	12/11/96	3	4.0	6.4	4.0	5.7	Overlay	4/1/97	PC	Ferrogard 901, 2	5.0	6.0
6	12/11/96	3	4.0	6.4	4.0	5.7	Overlay	4/2/97	7% SF	Ferrogard 901, 2	4.0	6.2
7	12/11/96	3	4.3	5.7	4.3	5.8	Overlay	4/1/97	PC	Rheocrete 222+, 1	4.0	7.8
8	12/11/96	3	4.3	5.7	4.3	5.8	Overlay	4/2/97	7% SF	Rheocrete 222+, 1	4.3	6.7
9	12/13/96	3	4.5	6.0	4.0	6.0	Overlay	4/3/97	PC/P	DCI-S, 4	-	5.4
10	12/13/96	3	4.5	6.0	4.0	6.0	Overlay	4/3/97	7% SF/P	DCI-S, 4	3.3	5.3
11	12/13/96	3	3.8	6.4	4.0	5.7	Overlay	4/3/97	7% SF/903	Ferrogard 901, 2	3.3	5.2
12	12/13/96	3	3.8	6.4	4.0	5.7	Overlay	4/3/97	PC/903	Ferrogard 901, 2	5.5	6.0
13	12/17/96	6	2.8	5.6	4.0	5.2	Overlay	4/1/97	PC	None, 0	5.0	6.4
14	12/17/96	6	2.8	5.6	4.0	5.2	Overlay	4/2/97	7% SF	None, 0	4.0	6.5
15	12/17/96	6	4.5	6.1	4.3	5.4	Overlay	4/1/97	PC	DCI-S, 4	5.0	7.4
16	12/17/96	6	4.5	6.1	4.3	5.4	Overlay	4/2/97	7% SF	DCI-S, 4	4.0	6.5
17	12/18/96	6	4.8	6.6	4.5	5.1	Overlay	4/1/97	PC	Ferrogard 901, 2	5.0	6.0
18	12/18/96	6	4.8	6.6	4.5	5.1	Overlay	4/2/97	7% SF	Ferrogard 901, 2	4.0	6.2
19	12/18/96	6	4.3	6.2	4.5	5.9	Overlay	4/1/97	PC	Rheocrete 222+, 1	4.0	7.8
20	12/18/96	6	4.3	6.2	4.5	5.9	Overlay	4/2/97	7% SF	Rheocrete 222+, 1	4.3	6.7
21	12/18/96	6	4.3	5.9	4.3	5.3	Overlay	4/3/97	PC/P	DCI-S, 4	-	5.4
22	12/18/96	6	4.3	5.9	4.3	5.3	Overlay	4/3/97	7% SF/P	DCI-S, 4	3.3	5.3
23	12/18/96	6	3.3	5.5	4.8	5.7	Overlay	4/3/97	7% SF/903	Ferrogard 901, 2	3.3	5.2
24	12/18/96	6	3.3	5.5	4.8	5.7	Overlay	4/3/97	PC/903	Ferrogard 901, 2	5.5	6.0
25	12/20/96	10	5.5	5.9	5.0	6.1	Overlay	4/1/97	PC	None, 0	5.0	6.4
26	12/20/96	10	5.5	5.9	5.0	6.1	Overlay	4/2/97	7% SF	None, 0	4.0	6.5
27	12/20/96	10	4.8	6.2	5.0	6.0	Overlay	4/1/97	PC	DCI-S, 4	5.0	7.4
28	12/20/96	10	4.8	6.2	5.0	6.0	Overlay	4/2/97	7% SF	DCI-S, 4	4.0	6.5
29	12/20/96	10	3.8	5.6	4.8	5.2	Overlay	4/1/97	PC	Ferrogard 901, 2	5.0	6.0

Box Number	Base Mix Date	chl, pcy	Base Mix Properties w/o Chl. Sl., in.	Base Mix Properties w/o Chl. Air, %	Base Mix Properties w/ Chl. Sl., in.	Base Mix Properties w/ Chl. Air, %	Type Repair	Repair Mix Date	Type Repair Concrete	Type, dosage CIA, gcy	Repair Mix Prop. Sl., in.	Repair Mix Prop. Air, %
30	12/20/96	10	3.8	5.6	4.8	5.2	Overlay	4/2/97	7% SF	Ferrogard 901, 2	4.0	6.2
31	12/23/96	10	3.3	5.2	4.5	5.3	Overlay	4/1/97	PC	Rheocrete 222+, 1	4.0	7.8
32	12/23/96	10	3.3	5.2	4.5	5.3	Overlay	4/2/97	7% SF	Rheocrete 222+, 1	4.3	6.7
33	12/23/96	10	3.8	5.7	4.0	5.4	Overlay	4/3/97	PC/P	DCI-S, 4	-	5.4
34	12/23/96	10	3.8	5.7	4.0	5.4	Overlay	4/3/97	7% SF/P	DCI-S, 4	3.3	5.3
35	12/23/96	10	3.5	5.6	4.8	5.8	Overlay	4/3/97	7% SF/903	Ferrogard 901, 2	3.3	5.2
36	12/23/96	10	3.5	5.6	4.8	5.8	Overlay	4/3/97	PC/903	Ferrogard 901, 2	5.5	6.0
37	1/7/97	3	3.8	5.0	4.3	5.1	OL/P	4/8/97	PC	None, 0	5.0	7.0
38	1/7/97	3	3.8	5.0	4.3	5.1	OL/P	4/8/97	PC	None, 0	5.0	7.0
39	1/7/97	3	4.3	5.2	4.3	5.1	OL/P	4/8/97	PC	DCI-S, 4	3.0	7.8
40	1/7/97	3	4.3	5.2	4.3	5.1	OL/P	4/8/97	PC	DCI-S, 4	3.0	7.8
41*	1/8/97	3	3.5	5.3	4.5	5.1	OL/P	4/8/97	PC	Ferrogard 901, 2	4.3	6.5
42	1/8/97	3	3.5	5.3	4.5	5.1	OL/P	4/8/97	PC	Ferrogard 901, 2	4.3	6.5
43	1/8/97	3	3.8	5.3	4.5	5.1	OL/P	4/8/97	PC	Rheocrete 222+, 1	3.3	7.7
44	1/8/97	3	3.8	5.3	4.5	5.1	OL/P	4/8/97	PC	Rheocrete 222+, 1	3.3	7.7
45	1/9/97	3	3.5	5.5	4.5	5.2	OL/P	4/11/97	PC/P	DCI-S, 4	2.3	7.7
46	1/9/97	3	3.5	5.5	4.5	5.2	OL/P	4/11/97	PC/P	DCI-S, 4	2.3	7.7
47	1/9/97	3	4.5	5.9	4.5	5.2	OL/P	4/11/97	PC/903	Ferrogard 901, 2	5.3	6.2
48	1/9/97	3	4.5	5.9	4.5	5.2	OL/P	4/11/97	PC/903	Ferrogard 901, 2	5.3	6.2
49	1/13/97	6	4.0	5.9	4.0	5.2	OL/P	4/1/97	PC	None, 0	5.0	6.4
50	1/13/97	6	4.0	5.9	4.0	5.2	OL/P	4/2/97	7% SF	None, 0	4.0	6.5
51	1/13/97	6	3.5	5.0	4.0	5.2	OL/P	4/1/97	PC	DCI-S, 4	5.0	7.4
52	1/13/97	6	3.5	5.0	4.0	5.2	OL/P	4/2/97	7% SF	DCI-S, 4	4.0	6.5
53	1/14/97	6	4.5	5.5	4.5	5.3	OL/P	4/1/97	PC	Ferrogard 901, 2	5.0	6.0
54	1/14/97	6	4.5	5.5	4.5	5.3	OL/P	4/2/97	7% SF	Ferrogard 901, 2	4.0	6.2
55	1/14/97	6	4.5	5.6	4.5	5.3	OL/P	4/1/97	PC	Rheocrete 222+, 1	4.0	7.8
56	1/14/97	6	4.5	5.6	4.5	5.3	OL/P	4/2/97	7% SF	Rheocrete 222+, 1	4.3	6.7
57	1/14/97	6	5.0	5.7	4.8	5.4	OL/P	4/3/97	PC/P	DCI-S, 4	-	5.4
58	1/14/97	6	5.0	5.7	4.8	5.4	OL/P	4/3/97	7% SF/P	DCI-S, 4	3.3	5.3
59	1/14/97	6	3.8	5.7	4.8	5.4	OL/P	4/3/97	7% SF/903	Ferrogard 901, 2	3.3	5.2

Box Number	Base Mix Date	chl, pcy	Base Mix Properties w/o Chl. Sl., in.	w/o Chl. Air, %	w/ Chl. Sl., in.	w/ Chl. Air, %	Type Repair	Repair Mix Date	Type Repair Concrete	Type, dosage CIA, gcy	Repair Mix Prop. Sl., in.	Repair Mix Prop. Air, %
60	1/14/97	6	3.8	5.7	4.8	5.4	OL/P	4/3/97	PC/903	Ferrogard 901, 2	5.5	6.0
61	1/15/97	10	3.8	5.5	4.5	4.9	OL/P	4/10/97	7% SF	None, 0	7.0	6.2
62	1/15/97	10	3.8	5.5	4.5	4.9	OL/P	4/10/97	7% SF	None, 0	7.0	6.2
63	1/15/97	10	3.8	5.1	4.5	4.9	OL/P	4/10/97	7% SF	DCI-S, 4	5.3	6.9
64	1/15/97	10	3.8	5.1	4.5	4.9	OL/P	4/10/97	7% SF	DCI-S, 4	5.3	6.9
65	1/16/97	10	4.5	5.6	4.3	3.9	OL/P	4/10/97	7% SF	Ferrogard 901, 2	4.5	6.2
66	1/16/97	10	4.5	5.6	4.3	3.9	OL/P	4/10/97	7% SF	Ferrogard 901, 2	4.5	6.2
67	1/16/97	10	4.5	5.5	4.3	3.9	OL/P	4/10/97	7% SF	Rheocrete 222+, 1	5.0	6.7
68	1/16/97	10	4.5	5.5	4.3	3.9	OL/P	4/10/97	7% SF	Rheocrete 222+, 1	5.0	6.7
69	1/17/97	10	5.0	5.7	5.0	5.5	OL/P	4/11/97	7% SF/P	DCI-S, 4	-	5.0
70	1/17/97	10	5.0	5.7	5.0	5.5	OL/P	4/11/97	7% SF/P	DCI-S, 4	-	5.0
71	1/17/97	10	4.5	5.5	5.0	5.5	OL/P	4/11/97	7% SF/903	Ferrogard 901, 2	2.5	5.2
72	1/17/97	10	4.5	5.5	5.0	5.5	OL/P	4/11/97	7% SF/903	Ferrogard 901, 2	2.5	5.2
73	1/22/97	3	4.0	5.9	4.0	5.7	Patch	4/15/97	PC	None, 0	3.3	7.5
74	1/22/97	3	4.0	5.9	4.0	5.7	Patch	4/15/97	PC	None, 0	3.3	7.5
75	1/22/97	3	4.0	5.4	4.0	5.7	Patch	4/15/97	PC	DCI-S, 4	4.3	7.7
76	1/22/97	3	4.0	5.4	4.0	5.7	Patch	4/15/97	PC	DCI-S, 4	4.3	7.7
77	1/23/97	3	4.3	6.0	4.5	5.2	Patch	4/15/97	PC	Ferrogard 901, 2	4.3	7.5
78	1/23/97	3	4.3	6.0	4.5	5.2	Patch	4/15/97	PC	Ferrogard 901, 2	4.3	7.5
79	1/23/97	3	4.0	5.9	4.5	5.2	Patch	4/15/97	PC	Rheocrete 222+, 1	7.0	6.0
80	1/23/97	3	4.0	5.9	4.5	5.2	Patch	4/15/97	PC	Rheocrete 222+, 1	7.0	6.0
81	1/23/97	3	4.0	-	5.0	5.4	Patch	4/17/97	PC/P	DCI-S, 4	3.8	7.7
82	1/23/97	3	4.0	-	5.0	5.4	Patch	4/17/97	PC/P	DCI-S, 4	3.8	7.7
83	1/23/97	3	4.0	5.4	5.0	5.4	Patch	4/17/97	PC/903	Ferrogard 901, 2	6.5	7.8
84	1/23/97	3	4.0	5.4	5.0	5.4	Patch	4/17/97	PC/903	Ferrogard 901, 2	6.5	7.8
85	1/28/97	6	4.5	6.0	4.5	5.6	Patch	4/15/97	PC	None, 0	3.3	7.5
86	1/28/97	6	4.5	6.0	4.5	5.6	Patch	4/16/97	7% SF	None, 0	6.8	7.7
87	1/28/97	6	4.8	5.3	4.5	5.6	Patch	4/15/97	PC	DCI-S, 4	4.3	7.7
88	1/28/97	6	4.8	5.3	4.5	5.6	Patch	4/16/97	7% SF	DCI-S, 4	4.8	6.1
89	1/29/97	6	4.3	5.8	5.0	5.3	Patch	4/15/97	PC	Ferrogard 901, 2	4.3	7.5

Box Number	Base Mix Date	chl, pcy	Base Mix Properties w/o Chl. Sl., in.	Base Mix Properties w/o Chl. Air, %	Base Mix Properties w/ Chl. Sl., in.	Base Mix Properties w/ Chl. Air, %	Type Repair	Repair Mix Date	Type Repair Concrete	Type, dosage CIA, gcy	Repair Mix Prop. Sl., in.	Repair Mix Prop. Air, %
90	1/29/97	6	4.3	5.8	5.0	5.3	Patch	4/16/97	7% SF	Ferrogard 901, 2	3.8	6.2
91	1/29/97	6	4.5	5.9	5.0	5.3	Patch	4/15/97	PC	Rheocrete 222+, 1	7.0	6.0
92	1/29/99	6	4.5	5.9	5.0	5.3	Patch	4/16/97	7% SF	Rheocrete 222+, 1	7.0	6.2
93	1/29/97	6	3.8	5.7	4.8	5.5	Patch	4/17/97	PC/P	DCI-S, 4	3.8	7.7
94	1/29/97	6	3.8	5.7	4.8	5.5	Patch	4/17/97	7% SF/P	DCI-S, 4	-	-
95	1/29/97	6	4.0	5.5	4.8	5.5	Patch	4/17/97	PC/903	Ferrogard 901, 2	6.5	7.8
96	1/29/97	6	4.0	5.5	4.8	5.5	Patch	4/17/97	7% SF/903	Ferrogard 901, 2	4.3	6.2
97	1/29/97	10	4.5	6.2	5.0	5.8	Patch	4/16/97	7% SF	None, 0	6.8	7.7
98	1/29/97	10	4.5	6.2	5.0	5.8	Patch	4/16/97	7% SF	None, 0	6.8	7.7
99	1/29/97	10	4.0	6.3	5.0	5.8	Patch	4/16/97	7% SF	DCI-S, 4	4.8	6.1
100	1/29/97	10	4.0	6.3	5.0	5.8	Patch	4/16/97	7% SF	DCI-S, 4	4.8	6.1
101	1/31/97	10	4.5	5.8	5.0	5.5	Patch	4/16/97	7% SF	Ferrogard 901, 2	3.8	6.2
102	1/31/97	10	4.5	5.8	5.0	5.5	Patch	4/16/97	7% SF	Ferrogard 901,2	3.8	6.2
103	1/31/97	10	4.5	6.0	5.0	5.5	Patch	4/16/97	7% SF	Rheocrete 222+, 1	7.0	6.2
104	1/31/97	10	4.5	6.0	5.0	5.5	Patch	4/16/97	7% SF	Rheocrete 222+, 1	7.0	6.2
105	1/31/97	10	4.3	5.9	5.0	5.9	Patch	4/17/97	7% SF/P	DCI-S, 4	-	-
106	1/31/97	10	4.3	5.9	5.0	5.9	Patch	4/17/97	7% SF/P	DCI-S, 4	-	-
107	1/31/97	10	4.8	6.0	5.0	5.9	Patch	4/17/97	7% SF/903	Ferrogard 901, 2	4.3	6.2
108	1/31/97	10	4.8	6.0	5.0	5.9	Patch	4/17/97	7% SF/903	Ferrogard 901, 2	4.3	6.2
125	3/5/97	6	4.8	6.6	4.0	5.4	OL/P	6/26/97	PC/2020	MCI 2005, 0.3	2.5	7.2
126	3/5/97	6	4.8	6.6	4.0	5.4	OL/P	6/27/97	PC/AXIM	Catexol, 3	2.0	5.8
127	3/5/97	6	5.0	6.2	4.0	5.4	OL/P	6/25/97	Rapid Set	None, 0	4.0	3.8
128	3/5/97	6	5.0	6.2	4.0	5.4	OL/P	6/23/97	15% LMC	None, 0	9.0	3.4
129	3/5/97	10	5.0	6.4	5.0	5.6	OL/P	6/26/97	PC/2020	MCI 2005, 0.3	2.5	7.2
130	3/5/97	10	5.0	6.4	5.0	5.6	OL/P	6/27/97	PC/AXIM	Catexol, 3	2.0	5.8
131	3/5/97	10	5.0	5.7	5.0	5.6	OL/P	6/25/97	Rapid Set	None, 0	4.0	3.8
132	3/5/97	10	5.0	5.7	5.0	5.6	OL/P	6/23/97	15% LMC	None, 0	9.0	3.5
137	4/29/97	6	4.3	6.7	5.0	5.6	OL/P	6/25/97	RS/LMC	None, 0	9.0	3.4
138	4/29/97	6	4.3	6.7	5.0	5.6	OL/P	7/21/97	ASPHALT	None, 0	NA	NA
139	4/29/97	6	4.8	7.0	5.0	5.6	OL/P	5/29/98	PC/P	DCI-S, 4	6.5	6.4

Box Number	Base Mix Date	chl, pcy	Base Mix Properties w/o Chl. Sl., in.	w/o Chl. Air, %	w/ Chl. Sl., in.	w/ Chl. Air, %	Type Repair	Repair Mix Date	Type Repair Concrete	Type, dosage CIA, gcy	Repair Mix Prop. Sl., in.	Repair Mix Prop. Air, %
140	4/29/97	6	4.8	7.0	5.0	5.6	OL/P	5/29/98	PC/903	Ferrogard 901, 2	4.0	8.5
141	4/30/97	10	5.5	6.9	5.0	5.3	OL/P	6/25/97	RS/LMC	None, 0	9.0	3.4
142	4/30/97	10	5.5	6.9	5.0	5.3	OL/P	7/21/97	ASPHALT	None, 0	NA	NA
143	4/30/97	10	5.5	7.0	5.0	5.3	OL/P	5/29/98	PC/P	DCI-S, 4	6.5	6.4
144	4/30/97	10	5.5	7.0	5.0	5.3	OL/P	5/29/98	PC/903	Ferrogard 901, 2	4.0	8.5
145	8/20/97	15	5.0	6.5	6.3	6.0	Overlay	5/28/98	PC	None, 0	1.5	8.0
146	8/20/97	15	5.0	6.5	6.3	6.0	Overlay	5/28/98	7% SF	None, 0	1.5	5.7
147	8/21/97	15	5.0	6.0	6.5	6.0	Overlay	5/28/98	PC	DCI-S, 4	3.75	8.5
148	8/21/97	15	5.0	6.0	6.5	6.0	Overlay	5/28/98	7% SF	DCI-S, 4	2.75	7.5
149	8/21/97	15	4.5	5.5	6.3	5.9	Overlay	5/28/98	PC	Ferrogard 901, 2	7.0	8.9
150	8/21/97	15	4.5	5.5	6.3	5.9	Overlay	5/28/98	7% SF	Ferrogard 901, 2	2.0	8.0
151	8/21/97	15	4.8	5.9	6.3	5.9	Overlay	5/29/98	PC	Rheocrete 222+, 1	2.25	5.6
152	8/21/97	15	4.8	5.9	6.3	5.9	Overlay	5/29/98	7% SF	Rheocrete 222+, 1	2.0	7.0
153	8/21/97	15	4.8	6.0	6.3	5.5	Overlay	5/29/98	PC/P	DCI-S, 4	4.0	5.4
154	8/21/97	15	4.8	6.0	6.3	5.5	Overlay	5/29/98	7% SF/P	DCI-S, 4	3.0	6.4
155	8/22/97	15	5.0	6.0	6.0	6.2	Overlay	5/29/98	PC/903	Ferrogard 901, 2	2.5	7.4
156	8/22/97	15	5.0	6.0	6.0	6.2	Overlay	5/29/98	7% SF/903	Ferrogard 901, 2	2.0	6.6

* The base of Box 41 was dropped and damaged prior to the placement of the patch and overlay

Table 2: Corrosion inhibitor admixture mixing schedule and mixture details, full depth slabs

Box Number	Base Mix Date	Properties Sl., in.	Air, %	Silica Fume,%	Fly Ash,%	HRWR dosage, gcy	Type CIA	CIA Dosage Gcy
109	3/12/97	3.0	6.4	0	0	0	None	0
110	3/12/97	4.8	5.8	0	0	0	None	0
111	3/19/97	3.0	6.6	7	0	0.4	None	0
112	3/12/97	5.0	5.1	0	25	0	None	0
113	3/13/97	3.8	5.0	0	0	0	Ferrogard 901	2
114	3/13/97	4.0	5.0	0	0	0	Ferrogard 901	2
115	3/13/97	3.5	5.3	7	0	0.3	Ferrogard 901	2
116	3/13/97	5.0	6.1	0	25	0	Ferrogard 901	2
117	3/17/97	3.3	6.7	0	0	0.4	Rheocrete 222+	1
118	3/17/97	3.3	6.3	0	0	0.4	Rheocrete 222+	1
119	3/17/97	4.0	8.0	7	0	0.5	Rheocrete 222+	1
120	3/18/97	4.0	6.3	0	25	0	Rheocrete 222+	1
121	3/18/97	5.0	5.8	0	0	0	DCI-S	3
122	3/18/97	5.0	6.0	0	0	0	DCI-S	3
123	3/18/97	3.3	5.2	7	0	0.3	DCI-S	2
124	3/18/97	-	5.6	0	25	0	DCI-S	2
133	3/19/97	5.0	7.5	0	0	0	MCI 2005	0.2
134	4/22/97	5.0	7.0	0	0	0	Catexol 1000	3
135	4/22/97	2.5	6.6	0	0	0	Impasse	1.5
136	4/22/97	4.8	5.5	0	0	0	DCI-S	2

Table 3: Mixture proportions for base concretes and full depth slabs, lb/yd^3

Mixture	PC	7% SF
Portland Cement[a]	635	591
Silica Fume	0	45
Fly Ash	0	0
Water	286	286
Coarse Aggregate[b]	1925	1925
Fine Aggregate[c]	1046	1030

a Type I/II
b #57 crushed granite
c silica

Table 4: Mixture proportions for overlays and patches, lb/yd^3

Mixture	PC	PC + SF
Portland Cement[a]	635	590
Silica Fume	0	45
Fly Ash	0	0
Water	286	286
Coarse Aggregate[b]	1524	1524
Fine Aggregate[c]	1419	1403

a Type I/II
b #78 crushed granite
c silica

Note: slabs 138 and 142 were patched and overlayed with heated asphalt consisting of No. 9 crushed stone and CRS2 emulsion.

Table 5. Compressive strength of slab and slab repair concrete, psi

Concrete	Admixture	Compressive Strength, lb/yd^3	
		28 day	12 month
PC Slab	None	5490	-
PC Slab	3 lb/yd^3	5117	-
PC Slab	6 lb/yd^3	4968	-
PC Slab	10 lb/yd^3	4913	-
PC Slab	15 lb/yd^3	-	-
PC Slab	2 gcy	5930	-
PC Slab	3 gcy DCI	5760	-
PC Slab	1 gcy Rheocrete 222+	4915	-
PC Slab	2 gcy Ferrogard 901	6020	-
PC Slab	0.2 gcy MCI 2005	5460	-
PC Slab	3 gcy Catexol 1000	4320	-
PC Slab	1.5 gcy Impasse	4480	-
7% SF Slab	None	6310	-
7% SF Slab	2 gcy DCI	6230	-
7% SF Slab	1 gcy Rheocrete 222+	5280	-
7% SF Slab	2 gcy Ferrogard 901	7420	-
25% FA Slab	None	-	-
25% FA Slab	2 gcy DCI	4560	-
25% FA Slab	1 gcy Rheocrete 222+	4200	-
25% FA Slab	2 gcy Ferrogard 901	4180	-
PC Repair	None	5340	6630
PC Repair	4 gcy DCI	5340	6160
PC Repair	1 gcy Rheocrete 222+	4840	5790
PC Repair	2 gcy Ferrogard 901	5820	6940
PC Repair	0.3 gcy MCI 2005	5040	-
PC Repair	3 gcy Catexol 1000	4690	-
PC Repair	15% LMC	5310	-
7% SF Repair	None	6710	7430
7% SF Repair	4 gcy DCI	6730	7300
7% SF Repair	1 gcy Rheocrete 222+	5920	6900
7% SF Repair	2 gcy Ferrogard 901	7130	7910
RS Repair	15% LMC	5590	-
RS Repair	None	8820	-

Results based on the average of two or more 4 inch by 8 inch cylinders.

Table 6. Permeability to chloride ion of slab repair concrete, coulombs

Concrete	Admixture	Permeability, Coulombs			
		28 day at 73° F	28 day at 100° F	90 day	12 month
PC Repair	None	4022	6040	-	2365
PC Repair	4 gcy DCI-S	7187	10703	-	2816
PC Repair	2 gcy Ferrogard 901	6021	6698	-	2612
PC Repair	1 gcy Rheocrete 222+	3878	4904	-	2138
PC Repair	0.3 gcy MCI 2005	-	-	5257	-
PC Repair	3 gcy Catexol 1000	-	-	4349	-
PC Repair	15% LMC	-	-	977	-
7% SF Repair	None	1205	1061	-	736
7% SF Repair	4 gcy DCI-S	2349	1794	-	1084
7% SF Repair	2 gcy Ferrogard 901	1384	1026	-	803
7% SF Repair	1 gcy Rheocrete 222+	906	664	-	543
RS Repair	15% LMC	-	-	14	-
RS Repair	None	-	-	17	-

Results based on the average of two 2 inch by 4 inch cylinders

Table 7. Freeze thaw durability of slab repair concretes

Concrete	Admixture	Freeze Thaw Durability, ASTM C666 Proc. A, 300 cycles		
		Surface Rating	Weight Loss, %	Durability Factor, %
PC Repair	None	No Data Available		
PC Repair	4 gcy DCI-S			
PC Repair	2 gcy Ferrogard 901			
PC Repair	1 gcy Rheocrete 222+			
PC Repair	0.3 gcy MCI 2005			
PC Repair	3 gcy Catexol 1000			
PC Repair	15% LMC			
7% SF Repair	None			
7% SF Repair	4 gcy DCI-S			
7% SF Repair	2 gcy Ferrogard 901			
7% SF Repair	1 gcy Rheocrete 222+			
RS Repair	15% LMC			
RS Repair	None			
VA Beach Spans 1, 2, 3	7% SF	Failed at 110 cycles		
VA Beach Spans 10, 11	7% SF, DCI	Failed at 50 cycles		
VA Beach, Spans 18, 19	7% SF, DCI	Failed at 50 cycles		
VA Beach, Spans 20, 21, 22	7% SF, Rheocrete 222	Failed at 50 cycles		
VA Beach, Spans 23, 24	7% SF, Armatec 2000/3020	Failed at 190 cycles		
VA Beach, Spans 26, 27, 28	7% Sf, DCI/Postrite	Failed at 50 cycles		

Virgina Beach data is from tests of concrete samples made at bridge site.

Table 8: Stabilized macrocell current (mA)

	Macrocell Current, mA	
Slab #	3/10/98-3/17/98	5/98
1	0.0076	-0.04
2	-0.0036	-0.02
3	0.0015	-0.04
4	-0.0066	-0.03
5	0.0207	-0.06
6	0.0011	-0.05
7	-0.0014	-0.02
8	-0.0073	-0.01
9	0.0136	-0.04
10	-0.0037	-0.04
11	0.0097	-0.04
12	0.0213	-0.05
13	0.0733	-0.22
14	0.0316	-0.13
15	0.0383	-0.11
16	0.0614	-0.21
17	0.0284	-0.12
18	0.0301	-0.19
19	0.0271	-0.09
20	0.2373	-0.51
21	0.0385	-0.11
22	0.0245	-0.1
23	0.0147	-0.08
24	0.055	-0.21
25	0.1944	-0.58
26	0.168	-0.65
27	0.1266	-0.48
28	0.1203	-0.49
29	0.1562	-0.45
30	0.1353	-0.62
31	0.0527	-0.23
32	0.0886	-0.6
33	0.1739	-0.63
34	0.1763	-0.65
35	0.1385	-0.51
36	0.1349	-0.53
37	-0.0079	0.06
38	-0.0092	0.07
39	-0.0072	0.06
40	-0.0086	0.03
41	-0.0011	-0.04
42	-0.0047	-0.02
43	0.0024	-0.05
44	-0.0019	-0.03
45	0	-0.02
46	-0.001	-0.03
47	-0.0036	-0.02
48	0.0027	-0.03
49	0.0073	-0.13
50	0.0001	-0.07
51	0.0171	-0.14
52	0.0046	-0.14
53	0.0143	-0.07
54	0.0023	-0.07
55	0.0295	-0.18
56	-0.0069	-0.09
57	0.0182	-0.08
58	0.0143	-0.08
59	0.04	-0.19
60	0.0175	-0.14
61	0.0388	-0.27
62	0.0245	-0.28
63	0.0665	-0.35
64	0.0235	-0.38
65	0.0135	-0.28
66	0.0267	-0.34
67	0.0219	-0.42
68	0.0399	-0.38
69	0.0342	-0.41
70	0.0293	-0.28
71	0.0384	-0.39
72	0.0288	-0.45
73	-0.0035	0.03
74	-0.0042	0.04
75	-0.0043	0.04
76	-0.0041	0.04
77	-0.0061	-0.01
78	-0.0028	0.02
79	0.0041	0
80	-0.0012	-0.03
81	-0.0024	0.01
82	-0.0043	0.02

Macrocell Current, mA		
Slab #	3/10/98-3/17/98	5/98
83	-0.0063	0.01
84	-0.0037	-0.05
85	0.0132	-0.07
86	-0.0042	-0.25
87	0.0075	-0.1
88	0.0061	-0.11
89	-0.0039	-0.06
90	0.0066	-0.13
91	0.0047	-0.19
92	0.0053	-0.13
93	-0.0012	-0.07
94	0.0054	-0.04
95	0.0022	-0.06
96	-0.0007	-0.04
97	0.0517	-0.38
98	0.0585	-0.48
99	0.0147	-0.34
100	0.0545	-0.37
101	0.0386	-0.46
102	0.0293	-0.38
103	0.04	-0.56
104	0.0687	-0.51
105	0.0531	-0.64
106	0.041	-0.3
107	0.0366	-0.48
108	0.0575	-0.41
109	-0.001	0.04
110	-0.0008	0.06
111	-0.0006	0.06
112	-0.0002	0.05
113	-0.0005	0.04
114	-0.0008	0.05
115	-0.0012	0.05
116	-0.0005	0.06
117	-0.0022	0.04
118	-0.0008	0.06
119	-0.0005	0.06
120	-0.0006	0.06
121	-0.0013	0.04
122	-0.0007	0.06
123	-0.0012	0.06
124	-0.0006	0.06
125	0.0497	-0.32
126	0.0258	-0.22

Macrocell Current, mA		
Slab #	3/10/98-3/17/98	5/98
127	0.0801	-0.21
128	-0.0013	-0.05
129	0.0825	-0.4
130	0.0742	-0.38
131	0.1152	-0.4
132	0.0188	-0.19
133	-0.0007	0.06
134	-0.0006	0.06
135	-0.0008	0.06
136	-0.0009	0.06
137	0.0463	-0.2
138	0.407	-1.44
139	0.397	-0.16
140	0.542	-0.36
141	0.1415	-0.73
142	0.2616	-0.81
143	0.17	-0.28
144	0.399	-0.62
145	0.574	-2.98
146	0.631	-2.74
147	0.524	-2.27
148	0.552	-2.45
149	0.685	-3.05
150	0.515	-2.42
151	0.457	-2.33
152	0.562	-2.57
153	0.522	-2.41
154	0.507	-2.27
155	0.619	-2.92
156	0.405	-1.85

Table 9. Macrocell potential (mV)

Macrocell Potential, mV	
Slab Number	5/98
1	-2.78
2	-1.11
3	-2.65
4	-2.22
5	-5.94
6	-5.6
7	-2.23
8	-1.18
9	-5.54
10	-2.98
11	-3.11
12	-6.22
13	-11.13
14	-10.88
15	-7.5
16	-11.2
17	-8.01
18	-13.39
19	-7.55
20	-25.89
21	-9.29
22	-8.59
23	-7.14
24	-12.78
25	-32.88
26	-38.62
27	-29.43
28	-29.37
29	-28.06
30	-33.51
31	-16.37
32	-31.86
33	-40.62
34	-40.16
35	-27.03
36	-30.41
37	-0.03
38	-0.17
39	-0.01
40	-0.02
41	-3.07

Macrocell Potential, mV	
Slab Number	5/98
42	-0.06
43	-4.41
44	-2.5
45	-2.12
46	-2.42
47	-1.6
48	-2.53
49	-5.75
50	-5.97
51	-6.08
52	-7.76
53	-3.45
54	-4.15
55	-10.17
56	-6.61
57	-4.43
58	-7.66
59	-16.06
60	-9.68
61	-22.75
62	-17.93
63	-25.9
64	-24.27
65	-20.13
66	-25.13
67	-3.45
68	-28.38
69	-15.59
70	-18.1
71	-27.08
72	-31.17
73	-0.55
74	-0.22
75	-0.04
76	-0.02
77	-2.2
78	-0.9
79	-1.57
80	-2.22
81	-0.79
82	-0.02

Macrocell Potential, mV	
Slab Number	5/98
83	-0.74
84	-2.8
85	-5.18
86	-13.76
87	-5.33
88	-8.59
89	-5.32
90	-9.08
91	-9.54
92	-7.88
93	-4
94	-3.95
95	-4.58
96	-4.43
97	-21.94
98	-43.5
99	-22.7
100	-26.24
101	-28.9
102	-26.33
103	-31.6
104	-53.92
105	-25.68
106	-18.93
107	-9.969
108	-30.89
109	0.03
110	0.06
111	0.06
112	0.04
113	0.04
114	0.06
115	0.05
116	0.05
117	0.03
118	0.06
119	0.06
120	0.05
121	0.03
122	0.06
123	0.06

Macrocell Potential, mV	
Slab Number	5/98
124	0.06
125	-17.28
126	-9.45
127	-15.87
128	-4.03
129	-16.86
130	-23.31
131	-30.75
132	-11.87
133	0.06
134	0.05
135	0.06
136	0.06
137	-15.76
138	-70.42
139	-8.26
140	-33.47
141	-31.74
142	-64.91
143	-36.21
144	-43.83
145	-101.47
146	-74.65
147	-77.02
148	-84.72
149	-92.27
150	-87
151	-78.59
152	-84.81
153	-73.47
154	-82.97
155	-24.52
156	-71.88

Table 10: Resistance between top and bottom bars

Resistance (Ohms)				
	Before Connection	After Connection		
Slab #	8/7/97	12/2/97	3/16/97	5/98
1	60	120	102	63.5
2	62	130	105	63
3	61	120	101	61.5
4	59	120	100	60
5	54	109	85	52
6	55	110	90	54.5
7	55	110	87	53
8	56	110	90	54.5
9	58	120	97	59
10	55	110	90	54.5
11	59	120	94	59
12	55	110	87	55
13	57	110	90	56.5
14	61	120	99	61
15	57	110	92	56
16	57	120	97	56
17	50	99	83	48
18	53	110	91	51
19	54	110	91	49.5
20	49	96	80	43
21	56	110	98	53
22	54	105	100	56.5
23	53	103	97	55
24	51	97	92	51
25	53	102	96	54
26	53	105	97	51
27	58	110	110	54
28	56	110	100	52
29	57	110	110	51
30	56	110	104	50
31	55	109	105	50.5
32	54	107	98	48.5
33	56	110	107	50
34	58	110	108	50
35	55	108	99	44
36	54	106	98	44
37	53	99	92	43.5
38	55	104	97	46
39	53	98	92	44
40	54	101	96	45

Resistance (Ohms)				
	Before Connection	After Connection		
Slab #	8/7/97	12/2/97	3/16/97	5/98
41	53	100	94	45
42	52	96	90	45
43	56	108	98	57
44	54	106	96	55
45	50	99	90	51.5
46	53	105	95	54
47	53	105	95	51
48	53	103	94	50
49	50	98	89	47
50	79	160	150	62
51	49	96	87	40
52	70	140	130	57
53	50	96	88	40.5
54	69	130	130	54.5
55	52	99	91	42
56	73	140	130	57
57	51	98	90	42
58	68	130	120	51
59	70	140	130	57
60	51	97	90	43
61	81	110	150	64
62	76	150	140	61
63	70	130	130	58
64	60	140	120	52.5
65	65	160	140	50.5
66	64	160	140	55
67	68	160	150	57
68	69	160	150	57
69	62	150	130	53
70	62	150	140	54
71	64	150	140	54
72	63	160	140	53.5
73	45	110	92	38
74	44	106	87	36
75	42	104	86	35
76	42	104	86	35
77	45	110	91	37.5
78	44	107	88	37
79	43	107	87	36
80	42	104	85	35.5
81	43	105	86	37
82	42	103	84	36
83	44	109	89	38

Resistance (Ohms)				
	Before Connection	After Connection		
Slab #	8/7/97	12/2/97	3/16/97	5/98
84	42	104	85	36
85	43	110	85	28.5
86	55	150	120	36
87	43	110	88	28.5
88	56	150	120	36.5
89	44	120	91	30
90	57	150	120	37
91	45	120	91	29.5
92	59	160	130	38
93	44	120	91	30
94	56	150	120	37.5
95	46	120	97	31.5
96	57	160	120	38
97	61	170	130	40
98	70	220	180	53
99	60	170	130	40
100	67	190	140	45
101	59	160	130	42
102	62	180	130	45
103	60	180	130	43
104	90	280	200	65
105	56	180	120	40
106	60	150	150	48
107	59	140	130	42
108	59	140	130	43
109	41	102	80	47
110	40	87	82	29
111	180	410	380	1200
112	400	1100	1100	2800
113	40	102	83	42
114	40	89	85	30
115	170	440	410	1200
116	260	710	640	2100
117	39	99	78	38
118	38	82	78	29
119	170	440	410	1100
120	230	580	530	1900
121	33	86	68	31
122	33	71	70	25.5
123	140	350	320	91
124	260	72	660	2100
125	39	91	85	29
126	41	96	95	32

Resistance (Ohms)				
	Before Connection	After Connection		
Slab #	8/7/97	12/2/97	3/16/97	5/98
127	57	120	110	39
128	45	103	102	35
129	42	93	93	34.5
130	48	120	120	39
131	63	130	130	42
132	48	110	110	37
133	43	90	85	30
134	46	108	104	34
135	33	66	64	25
136	31	64	62	23.5
137	66	140	140	46
138	102	82	120	38
139	52	73	100	54
140	52	73	100	55
141	63	130	130	43
142	93	190	140	53
143	63	93	140	62
144	62	79	99	50
145		60	72	26
146		54	62	23
147		58	70	25
148		56	66	24
149		65	70	24
150		67	76	26
151		68	86	29
152		68	75	25
153		70	75	25
154		70	77	25
155		72	77	26
156		71	81	27

Table 11: Open circuit potential bar b by Half Cell Meter

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/30/97	12/1/97-12/8/97	3/16/98	5/98
1	-0.186	-0.113	-0.060	-0.066
2	-0.185	-0.007	0.042	-0.008
3	-0.155	-0.099	-0.035	-0.113
4	-0.132	-0.056	0.006	-0.046
5	-0.194	-0.120	-0.043	-0.115
6	-0.136	-0.048	-0.018	-0.126
7	-0.133	-0.089	-0.049	-0.164
8	-0.148	-0.037	-0.004	-0.106
9	-0.178	-0.114	-0.071	-0.19
10	-0.151	-0.057	-0.001	-0.096
11	-0.155	-0.071	-0.025	-0.104
12	-0.212	-0.152	-0.096	-0.227
13	-0.254	-0.186	-0.160	-0.286
14	-0.290	-0.100	-0.077	-0.176
15	-0.265	-0.176	-0.140	-0.259
16	-0.211	-0.118	-0.098	-0.167
17	-0.208	-0.125	-0.081	-0.198
18	-0.170	-0.071	-0.044	-0.158
19	-0.216	-0.174	-0.152	-0.208
20	-0.311	-0.241	-0.198	-0.27
21	-0.207	-0.159	-0.119	-0.212
22	-0.218	-0.122	-0.061	-0.014
23	-0.189	-0.096	-0.039	-0.109
24	-0.233	-0.179	-0.093	-0.19
25	-0.314	-0.259	-0.210	-0.294
26	-0.234	-0.161	-0.130	-0.222
27	-0.321	-0.239	-0.180	-0.312
28	-0.269	-0.174	-0.123	-0.234
29	-0.263	-0.194	-0.134	-0.224
30	-0.231	-0.163	-0.132	-0.245
31	-0.269	-0.190	-0.141	-0.275
32	-0.244	-0.165	-0.108	-0.272
33	-0.310	-0.235	-0.208	-0.323
34	-0.278	-0.165	-0.152	-0.232
35	-0.256	-0.160	-0.127	-0.221
36	-0.277	-0.187	-0.153	-0.259
37	-0.096	-0.021	0.033	0.03
38	-0.075	-0.018	0.057	-0.008
39	-0.144	-0.087	0.006	-0.053

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/30/97	12/1/97-12/8/97	3/16/98	5/98
40	-0.129	-0.051	0.013	-0.045
41	-0.136	-0.065	-0.039	-0.142
42	-0.154	-0.069	0.057	-0.025
43	-0.176	-0.145	-0.100	-0.146
44	-0.177	-0.135	-0.099	-0.145
45	-0.169	-0.101	-0.058	-0.118
46	-0.168	-0.104	-0.073	-0.126
47	-0.151	-0.076	-0.023	-0.064
48	-0.160	-0.089	-0.068	-0.114
49	-0.199	-0.138	-0.087	-0.205
50	-0.150	-0.054	-0.017	-0.123
51	-0.245	-0.159	-0.115	-0.221
52	-0.189	-0.092	-0.031	-0.118
53	-0.173	-0.086	-0.050	-0.1
54	-0.134	-0.046	-0.015	-0.076
55	-0.200	-0.135	-0.142	-0.2
56	-0.158	-0.054	-0.020	-0.117
57	-0.190	-0.107	-0.071	-0.12
58	-0.194	-0.096	-0.056	-0.1
59	-0.191	-0.113	-0.063	-0.177
60	-0.218	-0.105	-0.069	-0.154
61	-0.186	-0.090	-0.053	-0.159
62	-0.202	-0.108	-0.065	-0.171
63	-0.215	-0.091	-0.078	-0.152
64	-0.210	-0.118	-0.070	-0.184
65	-0.188	-0.110	-0.068	-0.21
66	-0.195	-0.113	-0.078	-0.217
67	-0.178	-0.092	-0.840	-0.232
68	-0.202	-0.143	-0.112	-0.242
69	-0.243	-0.131	-0.105	-0.215
70	-0.207	-0.105	-0.720	-0.172
71	-0.227	-0.111	-0.790	-0.22
72	-0.202	-0.104	-0.600	-0.218
73	-0.093	-0.022	-0.006	-0.098
74	-0.100	-0.032	0.300	-0.058
75	-0.101	-0.016	-0.001	-0.088
76	-0.121	-0.046	-0.009	-0.103
77	-0.149	-0.070	-0.005	-0.17
78	-0.146	-0.057	-0.029	-0.127
79	-0.163	-0.104	-0.064	-0.152
80	-0.179	-0.065	-0.039	-0.16
81	-0.162	-0.085	-0.034	-0.136

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/30/97	12/1/97-12/8/97	3/16/98	5/98
82	-0.134	-0.039	0.019	-0.122
83	-0.149	-0.044	0.400	-0.111
84	-0.152	-0.034	0.130	-0.136
85	-0.169	-0.070	-0.550	-0.159
86	-0.167	-0.039	-0.140	-0.17
87	-0.198	-0.110	-0.063	-0.166
88	-0.172	-0.057	-0.320	-0.135
89	-0.180	-0.072	-0.370	-0.176
90	-0.153	-0.014	-0.025	-0.147
91	-0.212	-0.096	-0.073	-0.177
92	-0.188	-0.083	-0.340	-0.158
93	-0.211	-0.103	-0.058	-0.175
94	-0.183	-0.071	-0.029	-0.081
95	-0.181	-0.071	-0.060	-0.198
96	-0.133	-0.045	0.400	-0.133
97	-0.224	-0.100	-0.071	-0.168
98	-0.205	-0.100	-0.079	-0.198
99	-0.205	-0.054	-0.049	-0.188
100	-0.207	-0.084	-0.074	-0.19
101	-0.219	-0.096	-0.076	-0.215
102	-0.216	-0.091	-0.054	-0.207
103	-0.237	-0.088	-0.044	-0.231
104	-0.261	-0.124	-0.130	-0.258
105	-0.221	-0.121	-0.112	-0.228
106	-0.242	-0.162	-0.078	-0.204
107	-0.225	-0.137	-0.071	-0.23
108	-0.214	-0.148	-0.088	-0.223
109	-0.074	-0.073	-0.103	-0.16
110	-0.038	-0.047	-0.100	-0.164
111	-0.023	-0.068	-0.170	-0.139
112	-0.048	-0.030	-0.073	-0.154
113	-0.093	-0.128	-0.126	-0.16
114	-0.068	-0.069	-0.100	-0.167
115	-0.078	-0.088	-0.103	-0.163
116	-0.054	-0.100	-0.111	-0.171
117	-0.116	-0.119	-0.109	-0.164
118	-0.093	-0.106	-0.108	-0.147
119	-0.051	-0.084	-0.086	-0.145
120	-0.060	-0.093	-0.089	-0.144
121	-0.085	-0.070	-0.097	-0.156
122	-0.066	-0.077	-0.081	-0.124
123	-0.030	-0.049	-0.061	-0.126

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/30/97	12/1/97-12/8/97	3/16/98	5/98
124	-0.066	-0.076	-0.082	-0.13
125	-0.228	-0.177	-0.083	-0.251
126	-0.193	-0.133	-0.104	-0.242
127	-0.338	-0.338	-0.313	-0.1
128	-0.169	-0.072	-0.004	-0.13
129	-0.235	-0.200	-0.136	-0.183
130	-0.224	-0.192	-0.140	-0.253
131	-0.364	-0.369	-0.318	-0.422
132	-0.221	-0.145	-0.056	-0.196
133	-0.064	-0.073	-0.114	-0.152
134	-0.065	-0.064	-0.089	-0.124
135	-0.077	-0.078	-0.096	-0.137
136	-0.052	-0.630	-0.099	-0.116
137	-0.320	-0.319	-0.298	-0.41
138	-0.403	-0.599	-0.416	-0.026
139	-0.405	-0.386	-0.302	-0.079
140	-0.406	-0.421	-0.368	-0.077
141	-0.370	-0.386	-0.333	-0.466
142	-0.052	-0.323	-0.007	-0.054
143	-0.364	-0.403	-0.171	-0.275
144	-0.460	-0.464	-0.370	-0.258
145	-0.469	-0.383	-0.335	-0.363
146	-0.495	-0.387	-0.334	-0.36
147	-0.508	-0.393	-0.360	-0.368
148	-0.517	-0.397	-0.371	-0.434
149	-0.493	-0.406	-0.404	-0.464
150	-0.483	-0.384	-0.387	-0.445
151	-0.452	-0.366	-0.391	-0.378
152	-0.488	-0.335	-0.322	-0.425
153	-0.522	-0.358	-0.363	-0.408
154	-0.503	-0.333	-0.332	-0.441
155	-0.523	-0.400	-0.416	-0.52
156	-0.509	-0.379	-0.421	-0.463

Table 12: Open circuit potential bar b as measured by PR Monitor

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/5/98	3/24/98 - 3/31/98	5/98
1	-0.1738	-0.1287	-0.1281	-0.169
2	-0.0792	-0.0246	-0.0068	-0.0429
3	-0.1385	-0.0959	-0.0897	-0.1692
4	-0.1155	-0.0621	-0.0201	-0.0882
5	-0.1905	-0.1280	-0.0716	-0.1546
6	-0.1315	-0.0866	-0.0415	-0.1104
7	-0.1288	-0.1138	-0.1086	-0.1637
8	-0.1267	-0.0753	-0.0223	-0.0954
9	-0.1756	-0.1171	-0.1120	-0.177
10	-0.1288	-0.0734	-0.0294	-0.1012
11	-0.1193	-0.0842	-0.0702	-0.1096
12	-0.1781	-0.1491	-0.1218	-0.2037
13	-0.2446	-0.1911	-0.1887	-0.2474
14	-0.1729	-0.1113	0.1065	-0.1511
15	-0.2300	-0.1753	-0.1584	-0.2176
16	-0.1829	-0.1399	-0.1006	-0.1693
17	-0.1973	-0.1267	-0.0884	-0.1771
18	-0.1454	-0.1028	-0.0545	-0.1467
19	-0.1997	-0.1840	-0.1499	-0.2145
20	-0.2841	-0.2613	-0.2699	-0.2457
21	-0.2082	-0.1479	-0.1527	-0.1988
22	-0.1953	-0.1158	-0.0718	-0.1395
23	-0.1584	-0.0990	-0.0689	-0.1181
24	-0.2324	-0.1711	-0.1331	-0.1854
25	-0.2960	-0.2567	-0.2660	-0.3176
26	-0.2193	-0.1549	-0.1616	-0.2223
27	-0.2896	-0.2339	-0.2434	-0.3096
28	-0.2459	-0.1586	-0.1574	-0.228
29	-0.2586	-0.1853	-0.1669	-0.2273
30	-0.2120	-0.1697	-0.1621	-0.2349
31	-0.2416	-0.1987	-0.1715	-0.2564
32	-0.2391	-0.1688	-0.1641	-0.2523
33	-0.2965	-0.2442	-0.2506	-0.3151
34	-0.2608	-0.1804	-0.1855	-0.2309
35	-0.2410	-0.1679	-0.1563	-0.2124
36	-0.2637	-0.1969	-0.1881	-0.2673
37	-0.0498	-0.0471	-0.0070	-0.0278
38	-0.0367	-0.0421	0.0012	-0.0572
39	-0.1161	-0.0462	-0.0418	-0.021

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/5/98	3/24/98 - 3/31/98	5/98
40	-0.0723	-0.0398	-0.0279	-0.0441
41	-0.1127	-0.0750	-0.0715	-0.0988
42	-0.1164	-0.0726	-0.0078	-0.0076
43	-0.1685	-0.1558	-0.1253	-0.1204
44	-0.1634	-0.1322	-0.1376	-0.1209
45	-0.1580	-0.1168	-0.0825	-0.0974
46	-0.1558	-0.1183	-0.1072	-0.1021
47	-0.1320	-0.0662	-0.0516	-0.0651
48	-0.1540	-0.1055	-0.0744	-0.1041
49	-0.1937	-0.1305	-0.1341	-0.1749
50	-0.1417	-0.0616	-0.0403	-0.0874
51	-0.2203	-0.1439	-0.1550	-0.1905
52	-0.1666	-0.0867	-0.0717	-0.0991
53	-0.1676	-0.0963	-0.0684	-0.0843
54	-0.1166	-0.0641	-0.0366	-0.072
55	-0.1932	-0.1492	-0.1904	-0.2217
56	-0.1415	-0.0994	-0.0408	-0.1405
57	-0.1665	-0.1120	-0.1105	-0.1361
58	-0.1586	-0.1038	-0.0871	-0.1121
59	-0.1856	-0.1226	-0.1168	-0.1668
60	-0.2045	-0.1360	-0.1219	-0.1754
61	-0.1609	-0.1177	-0.1150	-0.1614
62	-0.1838	-0.1301	-0.1080	-0.0026
63	-0.1889	-0.1477	-0.1341	-0.1685
64	-0.1732	-0.1032	-0.1338	-0.1704
65	-0.1528	-0.1033	-0.1306	-0.1754
66	-0.1544	-0.1085	-0.1313	-0.1779
67	-0.1411	-0.0958	-0.1316	-0.2166
68	-0.1819	-0.1412	-0.1683	-0.2258
69	-0.2111	-0.1311	-0.1614	-0.184
70	-0.1767	-0.1098	-0.1455	-0.157
71	-0.2007	-0.1277	-0.1437	-0.1888
72	-0.1803	-0.1107	-0.1161	-0.1827
73	-0.0658	-0.0142	-0.0558	-0.0874
74	-0.0803	-0.0346	-0.0387	-0.0472
75	-0.0821	-0.0304	-0.0511	-0.0489
76	-0.0972	-0.0435	-0.0647	-0.0757
77	-0.1154	-0.0719	-0.0861	-0.1452
78	-0.1177	-0.0698	-0.0785	-0.0991
79	-0.1076	-0.1289	-0.1186	-0.1307
80	-0.1553	-0.0897	-0.0943	-0.1308
81	-0.1315	-0.0921	-0.1213	-0.1082

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/5/98	3/24/98 - 3/31/98	5/98
82	-0.1041	-0.0627	-0.0569	-0.0981
83	-0.1302	-0.0565	-0.0557	-0.0772
84	-0.1285	-0.0491	-0.0631	-0.123
85	-0.1492	-0.0872	-0.1256	-0.1492
86	-0.1401	-0.0593	-0.0454	-0.1455
87	-0.1686	-0.1283	-0.1125	-0.1575
88	-0.1475	-0.0812	-0.0746	-0.1227
89	-0.1472	-0.0846	-0.0875	-0.1454
90	-0.1202	-0.0308	-0.0698	-0.1064
91	-0.1807	-0.1097	-0.1207	-0.183
92	-0.1454	-0.0910	-0.1021	-0.1375
93	-0.1800	-0.0970	-0.1464	-0.1762
94	-0.1513	-0.0841	-0.0991	-0.0941
95	-0.1518	-0.0829	-0.1340	-0.1781
96	-0.1251	-0.0529	-0.0875	-0.1061
97	-0.1874	-0.1200	-0.1633	-0.161
98	-0.1787	-0.1184	-0.1879	-0.2038
99	-0.1761	-0.0941	-0.1433	-0.1758
100	-0.1835	-0.1113	-0.1691	-0.1671
101	-0.1838	-0.1059	-0.1667	-0.1746
102	-0.1823	-0.0998	-0.1226	-0.1726
103	-0.2077	-0.0977	-0.1733	-0.2039
104	-0.2092	-0.1439	-0.2256	-0.2363
105	-0.1698	-0.1368	-0.1865	-0.2118
106	-0.2466	-0.0939	-0.1822	-0.1694
107	-0.2371	-0.1245	-0.1603	-0.2087
108	-0.2263	-0.1281	-0.1701	-0.19
109	-0.0659	-0.0698	-0.0968	-0.1567
110	-0.0694	-0.0443	-0.0832	-0.1332
111	-0.0609	-0.0578	-0.0776	-0.1333
112	-0.0741	-0.0643	-0.1050	-0.1321
113	-0.0630	-0.0739	-0.1192	-0.1485
114	-0.1061	-0.0582	-0.0975	-0.1013
115	-0.0695	-0.0451	-0.0992	-0.1453
116	-0.0495	-0.0925	-0.1444	-0.1676
117	-0.1028	-0.1302	-0.1480	-0.1721
118	-0.0796	-0.0822	-0.1205	-0.1375
119	-0.0513	-0.0551	-0.0995	-0.1378
120	-0.0590	-0.0598	-0.1288	-0.1354
121	-0.0580	-0.0695	-0.1023	-0.1445
122	-0.0572	-0.0503	-0.0773	-0.1228
123	-0.0355	-0.0339	-0.0978	-0.1291

Open Circuit Potential, V (CSE)				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/5/98	3/24/98 - 3/31/98	5/98
124	-0.0496	-0.0716	-0.1172	-0.1269
125	-0.2300	-0.1565	-0.1725	-0.2102
126	-0.2034	-0.1077	-0.1858	-0.219
127	-0.3462	-0.3202	-0.3537	-0.36
128	-0.1806	-0.0788	-0.0898	-0.1178
129	-0.2889	-0.2163	-0.2264	-0.2114
130	-0.2353	-0.1777	-0.2149	-0.2425
131	-0.3702	-0.3379	-0.3708	-0.3911
132	-0.2375	-0.1181	-0.1468	-0.1875
133	-0.0523	-0.0630	-0.1144	-0.1351
134	-0.0536	-0.0591	-0.0973	-0.122
135	-0.0553	-0.0655	-0.1305	-0.1284
136	-0.0523	-0.0666	-0.1034	-0.1196
137	-0.1872	-0.2984	-0.3616	-0.3719
138	-0.3977	-0.5921	-0.4537	-0.4842
139				
140				
141	-0.3415	-0.3388	-0.3945	-0.4461
142	-0.5222	-0.4638	-1.0289	-0.4953
143				
144				
145	-0.4007		-0.4053	-0.4182
146	-0.4357		-0.4255	-0.3966
147	-0.4354		-0.4541	-0.3906
148	-0.4402		-0.4749	-0.4167
149	-0.4188		-0.4784	-0.4125
150	-0.4125		-0.4609	-0.3955
151	-0.4386		-0.4678	-0.4194
152	-0.4036		-0.3519	-0.408
153	-0.4693	-0.3837	-0.3958	-0.3969
154	-0.4432	-0.3437	-0.3657	-0.4178
155	-0.4194	-0.4091	-0.4416	-0.4369
156	-0.4245	-0.4088	-0.4590	-0.4177

Table 13: Corrosion rate bar b as calculated by PR Monitor

Corrosion Rate, mpy				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/12/98	3/24/98 - 3/31/98	5/98
1	1.107	0.838	0.700	0.912
2	0.590	0.416	0.256	0.603
3	1.813	0.643	0.538	0.61
4	0.626	0.585	0.206	0.493
5	1.673	0.953	0.838	0.69
6	0.866	0.564	0.417	0.66
7	1.250	0.555	0.663	0.795
8	6.514	0.351	0.506	0.95
9	2.055	0.665	0.452	0.719
10	1.172	0.361	0.259	0.654
11	0.864	0.342	0.501	0.769
12	1.452	0.739	0.486	0.749
13	3.209	1.200	0.865	1.509
14	1.153	0.632	0.453	0.88
15	4.046	1.083	0.846	1.085
16	1.328	0.337	0.400	0.205
17	2.147	0.872	0.666	0.98
18	2.474	0.329	0.551	1.528
19	3.023	0.822	0.605	0.157
20	0.310	0.320	0.428	0.311
21	0.927	0.546	0.402	0.829
22	1.213	0.445	0.307	0.974
23	2.062	0.576	0.438	1.251
24	2.545	1.144	0.651	1.452
25	13.066	1.186	0.823	1.423
26	4.069	0.337	0.424	1.803
27	17.172	1.569	0.675	1.453
28	1.285	0.317	1.671	0.807
29	4.033	0.935	0.623	1.022
30	1.938	0.366	0.621	1.185
31	3.749	0.484	0.809	1.738
32	1.884	0.241	0.396	1.808
33	2.230	0.683	0.613	1.028
34	0.874	0.381	0.420	0.733
35	1.813	0.453	0.772	1.473
36	14.824	0.658	1.061	0.006
37	0.366	0.392	0.682	0.587
38	0.945	0.527	1.022	0.973
39	0.716	0.398	0.496	0.513

Corrosion Rate, mpy				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/12/98	3/24/98 - 3/31/98	5/98
40	0.741	0.419	0.475	0.473
41	1.082	0.409	0.536	0.561
42	2.450	0.372	0.501	0.374
43	0.769	0.002	0.892	0.731
44	0.744	0.002	0.662	2.856
45	0.913	0.535	0.523	0.563
46	0.865	0.426	0.548	0.479
47	0.871	0.407	0.455	0.527
48	0.768	0.416	0.595	0.736
49	1.501	0.698	0.769	0.765
50	0.418	0.217	0.389	0.581
51	1.589	0.428	0.489	0.654
52	0.643	0.199	0.252	0.423
53	1.074	0.543	0.739	1.024
54	0.507	0.267	0.394	0.812
55	1.049	0.716	0.711	1.17
56	0.651	0.190	0.230	0.806
57	1.044	0.378	0.476	0.788
58	0.705	0.212	0.306	0.599
59	0.601	0.220	0.417	0.994
60	1.469	0.643	0.703	1.261
61	0.696	0.256	0.300	0.795
62	0.769	0.208	0.335	0.001
63	0.678	0.195	0.272	0.54
64	0.377	0.003	0.395	0.814
65	0.534	0.006	0.514	1.101
66	0.771	0.003	0.528	1.526
67	0.604	0.003	0.477	0.696
68	0.496	0.003	0.950	1.055
69	0.623	0.003	0.433	0.498
70	0.733	0.003	0.318	0.665
71	0.668	0.002	0.548	5.316
72	0.672	0.003	0.536	1.65
73	1.218	0.030	0.698	1.516
74	1.298	0.001	0.641	1.552
75	1.247	0.031	0.632	1.104
76	1.110	0.033	0.605	1.103
77	1.066	0.030	0.601	1.736
78	1.059	0.032	0.523	1.326
79	2.282	0.002	0.744	1.795
80	1.072	0.000	0.682	1.829
81	1.254	0.028	0.479	1.586

Corrosion Rate, mpy				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/12/98	3/24/98 - 3/31/98	5/98
82	1.178	0.002	0.517	1.292
83	1.053	0.031	0.589	1.548
84	1.203	0.026	0.658	1.885
85	1.320	0.031	0.697	1.948
86	0.516	0.005	0.350	0.515
87	1.091	0.031	0.681	0.902
88	0.737	0.003	0.465	0.522
89	0.891	0.031	0.696	0.83
90	0.396	0.003	0.790	0.908
91	0.852	0.002	0.954	1.463
92	0.673	0.002	0.724	0.918
93	1.156	0.005	0.743	0.896
94	0.493	0.002	0.462	0.732
95	1.145	0.001	0.743	1.045
96	0.655	0.002	0.587	0.5
97	1.117	0.003	0.729	1.011
98	0.770	0.007	0.688	0.759
99	0.505	0.002	0.448	0.553
100	0.544	0.002	0.491	0.543
101	0.502	0.004	0.589	1.035
102	0.852	0.005	1.009	1.124
103	0.481	0.002	1.114	2.907
104	1.527	0.004	0.917	1.208
105	0.684	0.002	0.538	0.631
106	0.504	0.122	0.666	0.866
107	0.538	0.786	0.847	0.846
108	1.045	0.480	1.029	1.622
109	1.050	0.444	8.222	1.121
110	0.852	0.720	2.636	1.34
111	0.453	0.193	0.412	0.848
112	0.288	0.197	0.293	0.5
113	0.713	0.000	0.973	0.961
114	0.602	0.404	1.043	1.231
115	0.205	0.247	0.345	1.982
116	0.163	0.214	0.332	0.459
117	0.738	0.495	0.985	1.175
118	0.453	0.437	0.834	1.032
119	0.193	0.256	0.539	0.754
120	0.152	0.197	0.288	0.578
121	0.881	0.555	0.997	1.228
122	0.552	0.728	0.989	1.317
123	0.260	0.315	0.362	0.579

Corrosion Rate, mpy				
	Before Connection	After Connection		
Slab #	9/24/97 - 10/10/97	12/1/97 - 1/12/98	3/24/98 - 3/31/98	5/98
124	0.389	0.609	0.341	0.745
125	1.031	0.039	0.816	1.218
126	0.753	0.539	1.101	1.356
127	0.833	0.002	2.187	2.049
128	0.873	0.002	0.780	0.981
129	1.462	0.022	1.088	1.034
130	1.014	0.003	0.953	2.029
131	1.011	0.002	6.660	1.374
132	0.938	0.001	0.944	1.041
133	0.579	0.507	0.738	1.13
134	0.699	0.518	0.810	1.546
135	0.500	0.489	0.784	1.07
136	0.552	0.429	0.806	1.153
137	3.354	0.485	1.807	1.7
138	0.001	0.016	0.000	0.128
139				
140				
141	0.368	0.789	1.471	1.766
142	0.009	0.001	0.225	0
143				
144				
145	4.687		2.596	2.459
146	5.082		7.105	2.303
147	5.920		2.936	1.99
148	9.577		3.797	4.291
149	3.915		3.584	2.479
150	3.700		2.857	2.501
151	4.472		3.668	2.249
152	3.572		1.286	2.174
153	5.360	2.617	2.070	2.789
154	5.303	2.329	1.533	3.775
155	7.783	3.984	3.016	2.517
156	6.689	2.001	2.263	2.535