

OFFICE MEMORANDUM

395



MICHIGAN

STATE HIGHWAY DEPARTMENT

JOHN C. MACKIE, COMMISSIONER

October 5, 1960

To: W. W. McLaughlin
Testing and Research Engineer

From: E. A. Finney

Subject: Comparison of Clear and White Polyethylene Sheets for Concrete Curing.
US 23 Overpass over Silver Lake Road, 4 Miles South of US 16 (B2 of
47-6-6). Research Project 55 B-30. Report No. 347.

Reported by R. H. Merrill and M. G. Brown

In response to a telephone request from Warren Cox, Bridge Construction Project Engineer, on August 25, 1960, verified by Clayton H. Voss, Assistant to the Bridge Construction Engineer, the Research Laboratory Division compared relative temperatures under 4-mil clear and white polyethylene sheets on a freshly poured concrete bridge deck. The Laboratory undertook the test because we had never made this particular comparison before, although we had accumulated considerable data of this kind for other curing materials.

The deck slab used for the tests was poured at 11:30 a. m. on August 26, 1960, and was covered at 2:50 p. m. Clear and white polyethylene sheets, measuring 13 by 24 ft, were stapled together at the 24-ft edge. Two small slits were cut in each sheet near the ends and thermometers inserted between the sheets and the slab. Readings were taken periodically from 3:00 p. m. to 10:00 p. m. on the 26th, and 8:15 a. m. to 5:00 p. m. on the 27th. These readings along with air temperatures are given in the attached table. Air temperatures at the site were taken with a thermometer slightly above deck level and in the sun; U. S. Weather Bureau readings were obtained in the shade at Lansing.

As might be expected, temperatures under the clear sheet were higher than those under the white. The difference reached a maximum of 15 F at 2:00 p. m. of the second day, August 27, when the temperature under the clear sheet was 106 F while the temperature under the white sheet was only 91 F, and the air temperature 82 F. Higher temperatures on the second day were due to the weather; the 27th was clear while the 26th was cloudy and windy.

It was also observed that the 4-mil sheets were too easily torn, indicating that a heavier sheet, possibly 6 or 8 mils thick, should be used for bridge decks. There was a considerable wind at the time the plastic films were put down and, as can be

W. W. McLaughlin

October 5, 1960

seen in Fig. 1, the pour was adjacent to exposed reinforcing steel with numerous wire ties protruding to catch and tear the billowing plastic sheets. A thicker sheet applied from a roll would undoubtedly be easier to control and less likely to tear in windy weather.

OFFICE OF TESTING AND RESEARCH

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EAF:RHM:js

- cc: H. E. Hill
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TABLE 1
TEMPERATURES UNDER CLEAR AND WHITE POLYETHYLENE CURING SHEETS

Date	Time	Temperature, Deg. F								Difference
		Air		White Polyethylene			Clear Polyethylene			
		Weather Bureau	on Deck	No. 1	No. 2	Avg	No. 1	No. 2	Avg	
8-26-60	3:00 p. m.	86		87	87	87	93	92	93	6
	3:15			90	90	90	99	97	98	8
	3:30			90	90	90	96	97	97	7
	3:45			91	91	91	99	97	98	7
	4:00	82		92	92	92	100	97	99	7
	5:00	80		94	94	94	102	98	100	6
	5:30			94	94	94	101	97	99	5
	7:00	77	78	93	93	93	97	93	95	2
	8:00	73	74	91	92	92	96	92	94	2
	9:00	70	70	84	84	84	88	84	86	2
10:00	68	68	81	81	81	86	82	84	3	
8-27-60	8:15 a. m.	61	78	76	77	77	80	78	74	-3
	8:45		80	78	78	78	86	84	85	7
	9:15	67	80	82	83	83	93	89	91	8
	9:45	70	80	83	84	84	95	90	93	9
	10:15	73	84	86	87	87	99	96	98	11
	11:00	76	85	91	92	92	105	100	103	11
	12:00	78	84	92	93	93	105	101	103	10
	1:00 p. m.	79	88	94	94	94	110	105	108	14
	2:00	82	87	91	90	91	108	103	106	15
	3:00	82	86	88	88	88	98	98	98	10
	4:00	83	86	86	87	87	98	96	97	10
5:00	83	86	88	90	89	100	99	100	11	

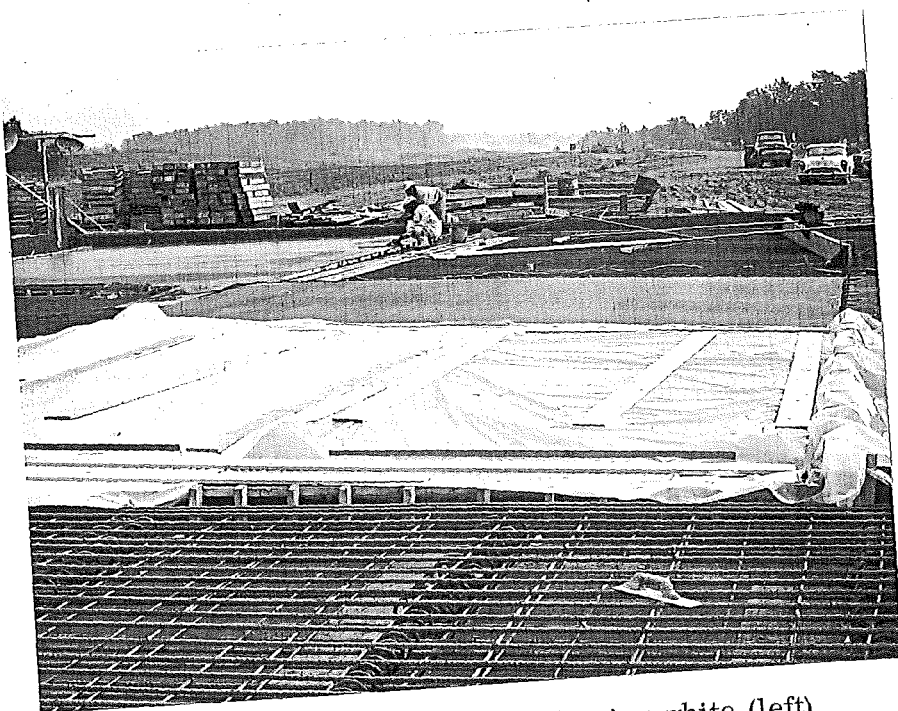


Figure 1. Overpass deck showing white (left) and clear (right) polyethylene sheets held down by boards.