C-2

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House Paint

Marshall Laboratory
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MEMORANDUM REPORT #329

METHOD TO DETERMINE CHALK RUNNING ON THE TEST FENCE

Introduction:

This memorandum is to record some observations made at the test fence December 20, 1950, on the effectiveness of various methods to measure chalk running from white house paint.

(A) The first attempt to measure chalk running was by painting a strip of black "Dulux" about 1 to 1-1/2 inches wide at the bottom of each panel over the white house paint. The panels were lapped in reverse so that there was no wash from one panel to another. This method has been unsatisfactory because the test area is small, and in later stages of exposure the black paint flakes from the white paint so that the measurement is lost.

(B) As an extension of this method, several series have been exposed in which a full size black painted panel has been mounted under one or more white panels. This method has been fairly successful in Series No. 10315 as will be described later, but has failed to give a good measure of chalk running in Series No. 9603 and others. We have noted at this inspection that the black panel does not come forward at a sufficient angle to catch much of the drip from the panel above; this explains the reason for unsatisfactory results in most of the series.

(C) In recent studies, a panel faced with red asphalt siding has been used on the theory that this would approximate the texture and color of a red brick surface.

(D) The Pigments Department has made two studies in which a row of red bricks has been set under the white paints flush with the surface of the last panel.

On December 20, reflectance readings and visual readings were made on black panels and on red brick. The objectives were: (1) to determine whether there is a satisfactory substitute for red

brick, in order to avoid the excessive difficulty of mounting bricks on the test fence, (2) to determine whether reflectance measurement can be used instead of visual rating.

Conclusions:

1. The extent of chalk running can probably be determined more easily on a black painted panel than on red brick because the contrast in brightness is greater and the chalk stays on the surface. Since panels are much easier to mount and handle, this would seem to be the best device for estimating chalk running for most studies.

2. Reflectance measurements give the correct order of chalk running in any one series. The absolute degree of discoloration of the black panel depends on the angle at which it is mounted. If the angle is standardized, reflectance measurements might be used to compare results between different series.

3. The red asphalt siding that has been used in several studies is quite unsatisfactory and should be replaced at once by black painted panels.

Action Proposed:

A standard method for mounting black painted panels to catch chalk from South Vertical panels will be set up as a TD method. A number of series will be changed over on the test fence to this standard method of mounting. In addition Series 11302, consisting of various modifications of No. 40 Outside White exposed in the Spring of 1950, will have red brick mounted under the black panel to be sure that significant results are obtained.

Details:

Table I lists the visual ratings for chalk running and reflectance of the black painted panels in Series 10815. In this series, the chalk is from single white panels. There is general agreement between visual rating and reflectance measurements, but the differences in reflectance are small. In order to be sure of the differences, the reflectance meter was calibrated so that the full scale was used in the range from 0 to 20% reflectance; the results were then recalculated to give percent reflectance on the usual scale with magnesium oxide as 100%. The black painted panels have a reflectance of about 3% before they are discolored by the chalk.

In the Pigments Department's Series 8614, white panels occupy the entire height of the fence with one black panel at the bottom to act as a guide for the drip. Beneath the black panel is a row of red bricks. The black panel is inclined at a considerable angle to bring its bottom edge even with the front of the bricks.

The black panels in this series show a very considerable discoloration from chalk, and there is also considerable discoloration on the red bricks below them. Reflectance measurements are shown in Table II for the paint that shows the most severe chalk discoloration on the red bricks and for the paint that shows the least chalk discoloration. Both reflectance readings and visual observation agree that discoloration of the black panels is a significant measure of chalk running.

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TABLE I

CORRELATION BETWEEN VISUAL RATING AND REFLECTANCE ON BLACK PAINTED DRIP PANEL

Series 10815 - Inspected 12/20/50

Panel	Visual Chalk Running	Average Reflectance %
8	Absent	3.1
9	V. Sl.	3.2
4	Sl.	3.2
11	Sl.	3.6
7	Sl.+	3.6
3	Sl.	4.0
10	Sl.+	4.0
1	Cons.	4.1
6	Cons.	4.1
2	Sl.+	4.1
5	Bad	4.5

COMPARISON OF CHALK DISCOLORATION ON BLACK
PAINTED PANEL WITH RED BRICK
PIGMENTS DEPT. SERIES 3614 INSPECTED 12/20/50:% REFLECTANCE
BAY #13 SEVERE VISUAL CHALK RUNNING

	Black Painted Panel					Red Brick				
% Reflectance	18	10	9	12		15	13	13	12	14
	22	15	13	12		10	11	9	9	9
Average reflectance	14					11				
Initial reflectance*	3					8				
Difference (Discoloration)	11					3**				

Bay #3: Least chalk running of series

% Reflectance	5	5	4	8		8	7	8	10	10
	5	8	8	10		8	6	7	9	9
Average reflectance	7					8				
Initial reflectance	3					8				
Difference (Discoloration)	4					0*				

*Reflectance of original brick: Brick #1 7, 8
2 9, 9
3 9, 8
Average: 8.3